

**FACTORS INFLUENCING THE IMPLEMENTATION OF
INFORMATION COMMUNICATION TECHNOLOGY PROJECTS IN
PUBLIC SECONDARY SCHOOLS IN KWALE COUNTY, KENYA**

BY

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DECLARATION

This research project is my original work and has not been presented for a degree or any other award in any other university or institution.

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DEDICATION

This work is dedicated to my loving and caring parents; Martin Otundo (my dad) and Teresa Martin (my mum).

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LIST OF ABBREVIATIONS AND ACRONYMS

BOG	Board of Governors
BOM	Board of Management
CAD	Computer Aided Design
CDF	Constituency Development Fund
CEB	Commercial Examining Board
CESI	Computer Studies Society of Ireland
CPD	Continuing Professional Development
DES	Department of Education and Science
EGFSN	Expert Group on Future Skills Needs
ERNIST	European Research Network for ICT in Schools of Tomorrow
ESI	Education Services Interactive (Project)
EU	European Union
FETAC	Further Education and Training Awards Council
ICT	Information and Communications Technology
ISC	Information Society Commission
MOE	Ministry of Education
MOEST	Ministry of Education Science and Technology
NCTE	National Centre for Technology in Education
SCR	Student-Computer Ratio
SDPI	School Development Planning Initiative (Post-primary)
SESE	Social, Environmental and Scientific Education
SESS	Special Education Support Service
SIP	Schools Integration Project
TIF	Telecommunications and Internet Federation
TIVET	Technical Industrial Vocational and Entrepreneurship Training
UNESCO	United Nations Educational, Scientific and Cultural Organization.
VEC	Vocational Education Committee
VLE	Virtual learning environment

ABSTRACT

ICT projects and their relevance in education are spreading rapidly in schools not just in wealthy countries, but increasingly in developing ones as well. However, although schools have had computers for almost two decades and some with ICT projects underway, ways to use and implement them effectively have evolved slowly and patchily. Technological revolution in schools has been beset by theoretical inadequacies that have kept educational technology at the margins of the established educational system. Research findings across the country have revealed that there are ICT facilities in the secondary schools such as computers, computer laboratories, internet connections, alongside the traditional methods of telecommunication. Further research has revealed that projects involving ICT use and integration in the Kenyan secondary schools have both internal and external challenging factors leading to weak implementation of these ICT projects. The study was done in secondary schools in Kwale County, Kenya. The purpose of the study was to establish the factors influencing the implementation of Information and Communication Technology projects in public secondary Schools in Kwale County. The objectives of the study were to establish how infrastructural facilities influence the implementation of ICT projects in public secondary schools in Kwale County, Kenya, to examine the role of stakeholders in ICT projects implementation in public secondary schools in Kwale County, Kenya, to determine how financial resource influence the implementation of ICT projects implementation in public secondary schools in Kwale County, Kenya, to establish the school administrative practices that supports the implementation of ICT projects implementation in public secondary schools in Kwale County, Kenya. Non-experimental descriptive survey design was used to establish the factors that influence the implementation of ICT projects in secondary schools Kwale County. There are 60 secondary schools that made up the target population. A sample of twenty schools which equated to 48% of the total population was used in the study. Stratified random was used to allow full participation of the schools. There are 650 teachers in secondary schools that made up the target population. Four teachers were randomly sampled in each sample school to fill the questionnaire, also six students. Eight principals were interviewed to represent each category of schools. Questionnaires, observation schedule and interview enabled the researcher collect data. Piloting was done in two schools to test the reliability and validity of the research instruments. The data collected was analyzed using statistical package for social sciences (SPSS). Descriptive statistics was used to present the results of the study and the general trends; this involved tabulating and describing data.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Education is described by BECTA (2009) as the mirror of the society, showing its strengths, weaknesses, hopes, biases and key values of its culture. Thus, education has a definite role to play in the development of people and countries. It has been cited as one of the most important determinants of economic growth. It is both an indicator, and an instrument, of development. Education increases labour productivity in both urban and rural sectors, and economic returns to investment in education are typically high. The human capita theory (Ajayi, L., 2009) stipulates that education is an investment that yields returns for the individual and society at large. In fact, the economic benefits of education derive not just from increases in cognitive skills, but to a far greater extent from the increase in non-cognitive abilities as reflected by changes in a person's ideas, perceptions and attitude Furthermore it is regarded as an instrument for the wholesome development of individuals in the modern world, especially, in this highly evolving technological environment (Kadzo, L., 2011).

In the recent years, Governments have not only been allocating resources to education but have also been undergoing an overhaul of educational reforms so as to match with the fast rate of globalization that has been influenced by the rapid technology change. This has been a major focus in educational reform structure especially in the Less Developed Countries (LDCs) in Sub-Sahara Africa, parts of Asia and parts of the South American continent. The reforms have given birth to the introduction of information communication technology (ICT) projects into the education system. This introduction of ITC projects in schools takes us back to the history of globalization and technological change (processes that have accelerated in tandem over the past fifteen years) which have created a new global economy powered by technology, fueled by information and driven by knowledge. The emergence of this new global economy has serious implications for the nature and purpose of educational institutions. As the half-life of information continues to shrink and access to information

continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time. Rather, schools must promote learning to learn, that is the acquisition of knowledge and skills that make possible continuous learning over the lifetime (UNESCO, 2009). When used appropriately, ICT is said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by making the teaching and learning an engaging and active process connected to real life (UNESCO, 2010).

However, the experience of introducing ICT in the school, classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. The effective integration of ICT into the educational system is a complex, multifaceted process that involves not just technology-indeed, given enough initial capital, getting the technology is the easiest part-but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing, among others. Due to ICT's importance in the society and possibly in the future of education, identifying the possible obstacles and enablers to integration of these ICT projects in schools would be an important step in improving the quality of teaching, learning and management (Tezci, E. 2011a).

In Ireland, the impact of ICT on business, on education and society generally has increased dramatically in recent years. In many respects Ireland has been a leader in the adoption of the technology and in capitalizing on its potential to develop her education thus the economy. For example, in 2003 Ireland was the leading exporter of computer software, while, a third of all personal computers sold in Europe are manufactured in Ireland (Ertmer, P. A. at el. 2010). This called for the technology foresight reports that recommended that the Government establishes a major fund to develop Ireland as a centre for world-class research excellence in ICT and biotechnology (Irish Council for Science Technology and Innovation, 1999). As part of its response, the Government initiated the Technology Foresight Fund of

more than €700 million in the year 2000. Science Foundation Ireland (SFI) was created to administer this fund, first as a sub-group within Forfás and subsequently on a statutory basis. In its 2006–2013 Strategy for Science, Technology and Innovation, (published in June 2006), the Government committed itself to building on the achievements of SFI over the previous six years and reiterated its vision for the development of Ireland as a knowledge-based economy (Al-ruz, J. A. and Khasawneh, S., 2011). Much has been achieved recently in ICT infrastructure in schools. This infrastructural development has required significant levels of investment, primarily by the State but also by individual schools and institutions OECD (2001, cited by Akaslan, D. & Law, E.L.-C., 2010) and others, pointed out that there are three main rationales for promoting the introduction of ICT projects in schools, namely the economic, the social, and the pedagogical.

The pedagogical rationale for promoting ICT in schools is concerned with the use of ICT in teaching and learning. It is intimately related, therefore, to the economic and social rationales, but ICT also has additional application in the teaching and learning process. It provides teachers with a range of new tools to facilitate traditional pedagogies; it also and perhaps more importantly, presents the teacher with the potential to develop new teaching methods. For the student growing up in a culture of all-pervasive technology, ICT provides new, and more exciting and relevant, learning opportunities. A report by the Information Society Commission (ISC) noted that, compared with major competitors, Ireland lagged some distance in the application of ICT in education (ISC, 2002 cited by Al-ruz, J. A. and Khasawneh, S., 2011). The report recommended that basic ICT skills should, as far as possible, become a core component of mainstream education. The ISC made a number of recommendations to the Government including priority for capital investment in ICT in schools, a commitment to establishing broadband connectivity for schools and other centres of learning, provision of technical support for the education system, integration of ICT in the curriculum, a review of ICT in teacher education, both pre-service and in-service (Ertmer, P. A. et al. 2010).

Across Africa and most developing countries there are many challenges in bringing ICTs into the education process in general. Awouters, V. and Jans, S. (2009) have identified a range of physical and cultural factors that affect ICT projects implementation in schools, including lack of reliable access to electricity, limited technology infrastructure (especially internet access, bandwidth, hardware and software provision), language of instruction and available software; geographical factors such as country size, terrain and communications; demographic factors such as population size, density and dispersion. The issues of implementation are further exacerbated by extreme poverty, growing prevalence of HIV/AIDS, and a lack of political will to alleviate the situation through proper planning. In addition, educational factors including levels of teachers' own education and literacy rates, and access to professional development play an important role. Indeed many studies indicate that it is teachers' attitudes, expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICT in teaching (or technophobia in teachers) that are the prominent factors hindering teachers' readiness and confidence in using ICT support. There is also a general inadequacy of learning resources, course curricula and other learning materials that incorporate ICT use (Andiko, 2004; OECD & PISA, 2010).

In South Africa, policy document was developed by the South African Department of Education. This policy contained a framework concerning ICT projects implementation in education (South Africa, 2001), which was later published by the ICT Review Panel Framing Paper 2013/2014 for the public about the objects and principles that underpin ICT projects. It states that over 26% of schools in South Africa are still without computers. In order to provide resources for schools to implement ICT, the government needs to cooperate with both the public and the private sector to ensure that more schools are equipped with modern technology for the improvement of education in South Africa (Palak, D. and Walls, R. T. 2009). This is to guarantee that our children are technologically equipped to compete in the global market. On a provincial level, progress in computer implementation in schools in South Africa has been made through projects such as the Gauteng Online in Gauteng, the Khanya Project of the Western Cape, as well as the Northern Cape's Connectivity Project

(Serhan, D., 2009). However, there are other privately managed Tux Lab projects for Open Source software such as the Shuttle worth Foundation, the Project Champions and Ubuntu in Port Elizabeth (South Africa,2010). Specific factors found to influence the implementation of ICT in schools include, the schools' infrastructure; the implementation and maintenance costs of computers; the role of the computer coordinator; the role of parents, teachers, the government, the private sector, the finances available, among other factors (W. Haggard. , 2006 cited by Lu, Z., Hou, L and Huang, X., 2010).

In Nigeria, ICT Application in Secondary Schools, is attributable to several factors. Research confirms that ICT development and application are not well established in Nigeria because of poor information infrastructure (Osuagwu, Prince. 2010). It has been reported by South wood (2004) that more than 40 percent of the population of Africa is in areas not covered by telecom services. Schools located in such areas will experience ICT connectivity problems. This finding is corroborated by Ndiku (2003) cited by Lewis, Charley (2010) who discovered that insufficient numbers of computers and peripheral devices inhibit deployment of ICT projects by teachers and by Lange, Peter (2010) who observed that inadequate ICTs was a challenge to integration of technologies in Canadian schools. Similarly, ITU (2010) discovered that unavailability of some ICT components in the schools hampered teachers' use of ICTs. This problem may be due to underfunding (Lewis, Charley, 2010) .Frequent electricity interruption ranks third as electricity failure has been a persistent problem militating against ICT projects application and use in Nigeria (Williams, Mark D. J. 2010).

Kenya has made remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcomes and time frames (World Bank, 2010). The process has had the benefit of sound advice from officials and stakeholders and, perhaps more importantly, strong leadership from the office of the Permanent Secretary of the Ministry of Education. However, universal implementation is challenging given the lack of sufficient resources, national ICT infrastructure, and even electrical supply – particularly in the rural areas (GOK, 2010). The Ministry of Education developed a Kenya Education

Sector Support Program (KESSP) in 2005 that featured ICT as one of the priority areas with the aim of mainstreaming ICTs into the education process. The National ICT Policy embedded this intent as a national priority and provided the impetus for the ministry to develop its sector policy on ICT in Education (MoE, 2011a).

The ministry moved quickly and, in June 2006, introduced the National ICT Strategy for Education and Training. It has representation from stakeholders involved in implementing the strategy and mobilizing resources such as donors and private sector partners like; The Semi-Autonomous Government Agencies (SAGAs) of the ministry, The Network Initiative for Computers in Education (NICE)-a consortium of NGOs involved in ICT in the education sector, Individual NGOs that meet specified criteria, Civil society organisations involved in ICT in education activities and Academia and/or individuals with experience in ICT in education projects (MoE, 2011b).The ministry's policy framework indicates that there are a number of challenges concerning access, use and implementation of ICT in Kenyan secondary schools, including high levels of poverty, limited rural electrification, and frequent power disruptions. Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1. Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-Schools programme (World Bank, 2010).

About 50 % of the secondary schools in the country are restructuring to accommodate ICT projects as it is of great help in providing multimedia information and allow access to a broader range of both managerial and instructional resources (MoE, 2011b). Most teachers see ICT as an important tool for motivating students, providing excellent tools for supporting teaching and also help learning. The schools also acknowledge that administrative functions have been enhanced by the computers (UNESCO, 2010). ICT spending is mostly on

hardware, software, infrastructure and training. ICT projects implementation in schools therefore requires investment in equipment, professional development and teacher training, technical support, connectivity and digital learning process. Investments in custom-made digital materials with highly relevant content for Kenyan classrooms in rural and urban contexts are important in order to tap into potential of ICTs for management, teaching and learning (World Bank,2010).

1.2 Statement of the Problem

ICT projects and their relevance in education are spreading rapidly in schools not just in wealthy countries, but increasingly in developing ones as well. However, although schools have had computers for almost two decades and some with ICT projects underway, ways to use and implement them effectively have evolved slowly and patchily. Technological revolution in schools has been beset by theoretical inadequacies that have kept educational technology at the margins of the established educational system. According to Oloo (2009) research findings across the country have revealed that there are ICT facilities in the secondary schools such as computers, computer laboratories, internet connections, alongside the traditional methods of telecommunication.

Kenya Education Sector Support Program(KESSP) in 2009 revealed that projects involving ICT use and integration in the Kenyan secondary schools have both internal and external challenging factors leading to weak implementation of these ICT projects. In addition, about 57per cent of secondary schools in Kenya are in the rural areas and they face a number of challenges including; high levels of poverty, limited rural electrification and frequent power disruptions, inadequate connectivity and network infrastructure (UNESCO, 2010) .This creates a digital divide between the rural and the urban schools as well as the developed and the developing countries. ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries. In Kenya, the ratio for universities and colleges is 1:45 while access at the primary school level is much more limited at 1:250 (MoE, 2011a).

The Education Management Information System (EMIS) survey of 2008/2009 indicated that over 40 per cent of the secondary schools in Kenya required functional telephones. Furthermore, 90 per cent of such schools needed to establish Local Area Networks (LANs) in order to improve sharing of learning resources. As at 31 December, 2008, there were 6,566 secondary schools in Kenya, of which 4,261 were publicly funded and the rest 2,305 privately funded with a total student enrolment of 1,382,211 and total teaching staff of 43,016 [Kenya National Bureau of Statistics 2009]. Due to this valuable role that ICT plays in the world at large, not limited to education, has attracted about 55 per cent of schools into the ICT world that has given birth the an influx of ICT projects in several secondary schools in Kenya (UNESCO, 2010). These projects have been accompanied by a number of challenges due to some internal and external factors that influence their implementation. The overall research problem that the study sought to address therefore was to investigate the factors influencing the implementation of ICT projects in secondary schools in Kwale County, Kenya.

1.3 Purpose of the Study

The purpose of the study was to examine the factors influencing the implementation of Information Communication Technology projects in secondary schools in Kwale County, Kenya.

1.4 Objectives of the Study

This study was guided by the following objectives:

- i. To establish how infrastructural facilities influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.
- ii. To establish how school administrative practices influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.
- iii. To determine how financial resource influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.

- iv. To examine the influence of stakeholders in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya

1.5 Research Questions

The study was guided by the following research questions:

- i. What is the influence of infrastructural facilities in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya?
- ii. How do school administrative practices influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya?
- iii. What is the influence of financial resource in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya?
- iv. How do stakeholders influence Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya?

1.6 Research Hypothesis

The study was guided by the following research hypothesis:

- i. Infrastructural facilities have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.
- ii. School administrative practices have a significant influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.
- iii. Financial resources have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.
- iv. Stakeholders have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.

1.7 Significance of the Study

Contemporary education involves extensive use of ICT for quick and effective communication which leads to improved operation. This study was to demonstrate how the use of ICT in secondary schools can be implemented and provide evidence for policy makers to use it in justifying institutionalization of the use of ICT. The existence of ICT projects in secondary schools increases the sustainable socio-economic development. Thus, the significance of this study was to examine whether the incorporation of ICT in secondary schools education will be beneficial to the students, teachers and other education stakeholders hence complementing the government in the execution of one of its projects involving ICT (Educational Process Off-shoring and Information Technology enabled services). The study was also to enable Kenya to attain the eighth Millennium Development Goal -develop a global partnership for development (MoE,2011b).

The findings of the study would help the stakeholders in education to understand the factors that affect the implementation of ICT projects in the education system and make relevant decisions. The Ministry of Education (MOE) would use the findings to formulate the appropriate ICT policies in line with the National ICT Policy (2006). The school administration would use the findings in making decisions on the type of ICT infrastructure to acquire as well as the technical support necessary. The curriculum developers would find the result of the study important in developing ICT curriculum that would maximize the potential of ICT in education. The teachers would understand how technology affect their instructional materials in class and may find it necessary to adopt the available ICT in their schools. The teacher training colleges would find the results crucial in developing educator courses to enhance pre-service ICT training on better application of ICT projects enablers in classrooms and schools. The community would understand their role in education and be more supportive in the development of ICT infrastructure in the schools especially in the rural areas (MHEST and NCST, 2010).

1.8 Basic Assumptions of the Research

This study presumed that infrastructural facilities like electricity and computer laboratories had an effect in the implementation of ICT projects in public secondary schools. It further presupposed that due to increased financial resources allocation by the MOE and that of Science and Technology to secondary schools for ICT projects development and implementation in educational institutions had increased the rate of ICT projects implementation in public secondary schools. In addition, the study also assumed that stakeholders and administrators are key players in the increased rates ICT projects implementation in public secondary schools.

1.9 Limitations of the Study

The study was limited by time due to the working hours in the work place and the distance factor to the schools to be visited and that distance of linkage with the supervisor. However this was overcome by creating time during the weekends and at times travelling the long distance late evening for information. Financing and getting teachers who were well versed with ICT projects implementation projects was a challenge. This study may not be generalizable to other institutions and other types of ICT projects. Differing resources allocation, different infrastructural facilities in different schools, differing management styles and different roles played by variant stakeholders restricted the research to secondary schools in Kwale County. Nevertheless, the underlying theoretical assumptions and methodology of this study, as well as the findings of this study should be of assistance to other institutions who want to assess the determinants of ICT projects implementation in secondary schools.

The study was limited in the sense that the sample size of 288 respondents for the study was not adequate enough to be representative of all the required respondents in such a study. This definitely did ultimately affect the study out come. Some of the respondents were not free to share information and this did definitely lead to misleading results of the research. Lack of adequate funds was a great drawback of the study in terms of meeting all the financial and logistical operations hence compromising a great deal the results of the study due to squeezing of the available resources to meet the research demands. The time for the research

was not enough for all the research procedures especially for collection of adequate data. The procedures were done in hurry so as to complete the research in time. Time constraint was therefore a great drawback as far as the research results was concerned. The study suffered limitations like technicalities with interviewing the teachers and other ICT officers with busy schedules some of whom did not take their time in responding to the research questions as required. This in a way resulted to compromization of the results of the research.

1.10 Delimitations of the Study

The study delimited itself by concentrating on the factors influencing ICT projects implementation in public secondary schools. The geographical scope was selected from public secondary schools in Kwale County, Kenya. The research targeted the management/school principals, deputy principals, teachers and students in schools with ongoing or upcoming ICT projects in Kwale County. The researcher found it convenient doing the research since he is ailing from Kwale County and is familiar with most of the secondary schools in this area and this would make it easier for him to obtain the required data from the schools. The researcher used a consent form seeking the acceptance or rejection of the respondents to participate in the study and this assured the respondents of their voluntarism in participation in the research. The researcher was set to interview by administering questionnaires to school heads and teachers with knowledge on ICT and this improved the integrity of the research in terms of quality. The researcher administered both questionnaire and key informant guide to the respondents in order to obtain both quantitative and qualitative information and this improved the research findings in terms of quality.

1.11 Definitions of Significant Terms

Application of ICT in Education

Use of ICT to enhance instruction and create rich environment to help each individual student develop a depth of understanding and critical thinking. ICT knowledge and skills can be gained by teachers through: teacher pre-service training, in-service training and induction courses, technical support and computer consultants.

ICT Infrastructure

Physical equipment/hardware and software that enables a network to function.

Information Communications Technologies

Includes technologies both traditional for example radio, television, print, video and newer technologies for example internet virtual reality, distance education, mobile phones etc that are intended to fulfill information processing and communication.

Infrastructure Facilities

A set of interconnected structural elements that provide framework supporting an entire structure of development. Include buildings, laboratories and electrical connections.

School Administrative Practices

Refers to ways and procedures of directing the operation of a given project and the entire decision making process.

Financial Resources

All the money, either liquid or solid that is needed to meet all the expenses that are geared towards seeing ICT projects become a reality.

Stakeholders

Are individuals/groups/firms/organizations that have either direct or indirect interest in the ICT projects. They include the students, teachers, government, NGOs, politicians, religious leaders among others.

1.12 Organization of the Study

This report is organized in five chapters. Chapter one is the introduction which includes the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, statement of the problem, purpose of the study, objectives of the study, research questions, research hypothesis, significance of the study, delimitations of the study, basic assumptions and the definition of significant terms. Chapter two of the study consists of the literature review with information from other articles which are relevant to the researcher. Chapter three contains the research design, target population, sampling procedures and sample size, methods of data collection, data validity, data reliability, and data analysis techniques, ethical considerations and operational definition of variables.

Chapter four contains key findings which include profile of the respondents, tables of descriptive statistics of variables and analysis of factors influencing ICT projects implementation in schools. Chapter five is on summary of findings, discussions, conclusions, recommendations and suggested areas for further reading.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section summarizes the literature that is already in existence regarding factors influencing ICT projects in secondary schools and their relationship. It presents an overview of previous work on related topics that provide the necessary background for the purpose of this research.

2.2 Information Communication Technology in Education

According to Bingimlas, K. (2009), Technology Integration Initiative was designed in Ireland to support schools in developing their ICT infrastructure. Schools received grants for the purchase of computer hardware, and those schools that did not already have an internet connection were assisted in getting on line. The aim of the Technology Integration Initiative was to have at least 60,000 computers in schools by the end of 2001. In the following year the NCTE census reported that there were some 84,000 computers in Irish schools. The Teaching Skills Initiative recognized that there was little point in putting computers in schools unless teachers were trained in their use. This initiative provided for teacher training in three distinct areas, namely ICT skills and awareness, professional skills development in ICT, and pedagogical skills development. The Schools Integration Project dealt with whole-school development and investigated a range of teaching and learning topics with regard to ICT integration. Approximately ninety pilot projects were established in a number of “lead” schools, which worked in partnership with education centers, businesses, industry, third-level institutions, and the community. Most of the individual projects implemented as part of the SIP concluded in 2001 and 2002, and the remainder were completed in 2004 (Broadley, T., 2012).

Schools IT 2000 envisaged that ICT advisors would be appointed in education centres to support the work of the NCTE by providing leadership, training and support, including on-line support, at the regional level and by providing regular feedback on progress and issues arising. Ultimately some twenty ICT advisors (later increased to twenty-one)—one in each of

the full-time education centres-were appointed. The main role of these advisors may be summarised as follows: to advise and support teachers in their region in integrating ICT in their teaching and in their students' learning, to build a knowledge base on all matters relating to the use of ICT in their local schools. A report on the implementation of Schools IT 2000 published in 2001 revealed a high level of satisfaction with the initiatives implemented under IT 2000 -National Policy Advisory and Development Committee (Tubaishat, A. and Lansari, A. 2011).

According to Tubaishat, A. and Lansari, A. (2011), the report, however, identified three issues of concern as follows: the need for more training for teachers, the need for more funding (equipment and computers, maintenance, support), the need for more support (technical support, encouragement to use ICT). Based on its findings, the committee made recommendations covering a range of areas, including policy, funding, and the professional development of teachers, pre-service teacher education, infrastructure, and technical support. In 2001 the Government launched its second policy document on ICT in education, (A Blueprint for the Future of ICT in Irish Education). This was a three-year strategic plan designed to support the continuation of the main initiatives begun under IT 2000 and to build on the progress achieved under that plan. The main objectives of the Blueprint policy were to: to expand ICT capital provision to schools, increase access to, and the use of, internet technologies, further integrate ICT in teaching and learning, enhance professional development opportunities for teachers (BECTA, 2009).

Schools in the LDCs especially in Africa and those in their development phase have not been left behind as far as ICT in education is concerned. Bordbar, F. (2010; 2011) points out that many developed countries have implemented ICT successfully into schools for teaching and learning, and argue that, owing to the cost of implementing ICT into education, many LDCs have fallen behind with the implementation process. According to Broadley, T. (2012), most governments around the world see the development of ICT policies as indispensable to the successful integration of ICT in education. According to Kozma and Anderson (2010),

countries from Chile to Finland and from Singapore to the United States have all set national goals and policies that identify a significant role for information and communication technologies (ICT) in improving their education systems and reforming their curricula. Major investments have been made to increase the numbers of computers in schools and the networking of classrooms (2002:387). While governments do all they can to initiate computer implementation in schools, it is the poorer countries who have lagged behind in the computer implementation process. A report published by UNESCO (2010) on the state of ICT projects in education in Africa states that, although ICT in education is seen as significant in many aspects in a computer-rich world, there is still a huge gap regarding implementation of computers in schools between rich and poorer countries. This is what is known as the 'digital divide' (Williams, 2011). World Bank (2010) describe the 'digital divide' as a growing disparity between those individuals and communities that have and those that do not have easy access to new information technologies, (2001:261). The digital divide is more evident in the implementation rate of computers in schools.

According to Castro Sánchez, J. J. and Alemán, E. C., (2011.), while many developed countries have had a 90 – 100% computer implementation success rate; developing countries have had less success with the implementation of computers in their schools. For example in United Kingdom, the government spending on educational ICT in 2008–09 in the UK was £2.5bn, in United States, the expenditure on K-12 schools and higher education institutions was \$6 billion and \$4.7 billion respectively in 2009 and in New Zealand, the government spends over \$ 410 million every year on schools ICT infrastructure (Ajayi, L., 2009). Despite all these investments on ICT infrastructure, equipments and professional development to improve education in many countries, (Barolli, E., 2012) claimed that huge educational investment have produced little evidence of ICT adoption and use in teaching and learning especially in Turkey. Evidence suggests that education sector is investing heavily on ICT projects but the implementation of these educational ICT projects lagged behind than in the business sector (Bingimlas, K., 2009).

According to Polikanov and Abramova (2003), cited in Saekow & Samson, (2011); although Internet access in Africa is among the lowest in the world, ICT in Africa is rapidly increasing. Many African states now have Internet access, with South Africa the leader in this regard in southern Sahara. They further argue that the majority of Internet users in Africa are rich males, who speak English or any other Western language and live in the cities. However, many African countries still do not have adequate Internet connectivity due to a lack of infrastructure (Afshari et al 2009). This inadequacy in ICT infrastructure and connectivity reflects the pessimists' idea (Bingimlas, K., 2009) that ICT will broaden the divisions that exist in the so-called 'digital divide' (Warschauer, Knobel and Stone, 2004, cited in Afshari et al 2009) between the rich and the poor nations. ICT policies are yet to be developed by governments in Africa to ensure successful integration of ICT in all spheres of society, especially in education (Kawooya, 2004; Kadzo, 2011; Ayere, Odera & Agak, 2010). This also explains why it was very difficult to find ICT policies of African countries on the Internet.

As in many other countries in the world, the South African government maintains an optimistic view regarding ICT projects implementation in schools (UNESCO, 2009). ICT is perceived as a panacea to many educational, social and economical problems. In a speech made by President Thabo Mbeki in 2001, he said that South Africans must continue the fight for liberation against poverty, against under-development, against marginalization and information and communications technology is a critically important tool in that struggle (Imbizo for African Youth, 2001, as cited in the White Paper on e-Education (DoE, 2010:10). At this time, the state of ICT in South African schools was worth considering, since only 26.5% of schools in South Africa were found to be having access to computers for teaching and learning in 2002, according to the White Paper on e-Education (DoE, 2010:1-2).

The South African government's response to address the digital divide was to establish the Presidential International Advisory Council on Information Society and Development in 2001 (DoE, 2004, cited in Park, et al., 2009). One of the council's key areas of focus was ICT in education, especially by addressing the digital divide (DoE, 2004). In addition,

various other policy frameworks have been put in place to enable the integration of ICT into teaching and learning (Williams, 2010). These policies are dealt with in a number of documents published by the South African government, including the “Draft White Paper on e-Education (DoE, 2003), the Revised National Curriculum Statement documents for Grades R-9 for the General Education and Training band (DoE, 2001), the Draft National Curriculum Statement for Grades 10-12 (Schools): Computyping (Computer Applications Technology) (DoE, 2002a) and the Draft National Curriculum Statement for Grades 10-12 (Schools): Computer Studies/Information Technology/Computer Science) (DoE, 2002b)” (Williams, 2010).

Like many other countries in the world, Kenya has developed National ICT Policy (2006). It sets out the nation’s aims, principles and strategies for the delivery of Information and Communications Technology to improve the livelihoods of Kenyans (MoE, 2011b). Ministry of Education (MoE) introduced the National ICT Strategy for Education and Training (Farrell 2007).The ICT policy gives an opportunity for establishment grass root based infrastructure for knowledge sharing (Mureithi and Munyua 2009; MoE, 2011a.). The ICTs in Education Options Paper (MOEST 2005), discusses the ways in which information and communications technologies (ICTs) can be leveraged to support and improve the delivery of quality education for all Kenyans. It provides a comprehensive range of potential technologies to improve teaching, learning, and management. It is intended to enable the government of Kenya (GOK) to plan appropriate ICTs in education interventions as they move forward with the comprehensive Kenya Education Sector Support Programme 2005 – KESSP (UNESCO, 2005).This includes interactive radio instructions (IRI), use of computers in schools, development of ICT skills and the access of internet (Ayere, M.A.; Odera, F.Y. and Agak, J., 2010).

According to Ayere, Odera & Agak (2010), there is rich literature on ICT initiatives in Kenya both by GOK and nongovernmental organizations (NGOs). GOK and the U.S. Agency for International Development (USAID) have a joint commitment to improve education in Kenya in collaboration with Kenya’s Ministry of Education. This is aimed at

Accelerating 21st Century Education (ACE) by improving the quality of primary and secondary education through the effective use of information and communications technology (ICT). The initiative to establish a School Technology Innovation Center (STIC) in Nairobi will serve as a hub where education leaders and teachers access the latest information on technology solutions that are proven to enhance innovative teaching and learning, thus improving the skills needed by students to thrive in the 21st century (Andiko, 2009).

A report in the CIA WorldFactbook (2010) shows that Kenya has government ICT Board whose main objective is to avail quality and affordable technical support to the Digital Villages to enable their smooth operation. The board has technical support focus points of standardized method for the testing and implementation of new software, the upgrading of hardware and the overall tracking of licenses and equipment. It also develops a collaborative relationship with the person responsible for Technical support and encourage them to include capacity building in the planning of future changes. The board works closely with the education institutions to ensure quality technical services as well as the internet providers. From research, the attempt to integrate ICT in Kenyan secondary schools is faced by various challenges such as Lack of adequate number of computers in the schools, inability to acquire sufficient computers or update those which are obsolete is due to lack of finances, fast changing technology and high overhead costs, loaded curriculum which make it difficult to find time to prepare ICT teaching materials, Lack of a unified school curriculum in primary and secondary schools, resistance by teachers to use ICT in teaching and learning, the lack of government employed Teachers the schools are forced to hire thus draining the scarce resources which could have been used for upgrading the ICT facilities (Kidombo 2009, Oloo 2009). This is backed by the government report on ICT capabilities in secondary schools in Kenya (Kadzo, L., 2011).

2.3 Role of Infrastructure in ICT Projects Implementation

Haverila, M. (2011) define infrastructure as basic physical and organizational structures needed for the operation of a society or enterprise or reproductive system , or the services

and facilities necessary for an economy to function. It can be generally defined as the set of interconnected structural elements that provide framework supporting an entire structure of development. It is an important term for judging a country or region's development. GeSCI (2009) define infrastructure in ICT as the computer and communication hardware, software, databases, people, structures and policies supporting an enterprise's information management functions. According to the World Bank Institute report of 2009, the backbone of ICT projects in education ties itself to infrastructural facilities that range from hard infrastructure like: computer laboratories, computers, electricity and computer hardware, to software infrastructure like local internet connection and computer software.

UNESCO carried a survey report about ICT projects education in most countries in Africa in 2005. According to Keengwe, J. and Onchwari, G., (2009) most countries surveyed have, or are in the process of, liberalising their telecommunications policies to enable more competition and diversity of service providers in the industry. While this is having the effect of lowering the cost of access to information and telecommunication infrastructure, the costs of connectivity remain unaffordable for most education institutions. Furthermore, there are huge gaps between urban and rural areas in terms of access to ICT infrastructure. Access to a reliable supply of electricity is a general problem but is particularly severe in rural areas because of the difficulty of connecting to national electrical grids. There is a general lack of human resource capacity to provide ICT training and equipment servicing, and there is also a lag between the availability of ICT infrastructure and the ability of agrarian societies to integrate it to benefit national development. Djibouti, for example, is at the forefront with a digital telecom network with two earth stations and the landing point for three undersea cables linking to Asia, the Middle East, and Europe (Lange and Peter. 2010). According to Broadley (2012), ICT projects implementation requires physical infrastructure that is not limited to power supply and structures like buildings, technical expertise and psychological readiness. ICT projects equally can only be managed and used by people with some level of technical skills. From this report, ICT projects in schools are majorly depended on three

infrastructural facilities that are not limited to; Electricity/power supply, Structures/Buildings like computer laboratories and Computers.

2.3.1 The Role of Electricity in ICT Projects Implementation

According to Haverila, M. (2011), African Ministries of Education have begun to be more proactive in co-ordinating and leading the development of ICT infrastructure in school systems as their ICT policies and implementation plans have taken shape. This is accrued to the major role of played by infrastructure such as electricity in ICT projects implementation. It is common knowledge that computers, phones, radios, projectors, televisions and even video players cannot work without power that is in the form of electricity. The World Bank (2013), reports that, in Djibouti, half of the population already has access to electricity, making the country a regional leader. Power is however expensive, mostly produced on imported oil. In Ethiopia, on the other hand, only one eighth of the population has access to the relatively cheap hydroelectric power, which furthermore is heavily underdeveloped in terms of ICT integration and use in education and other sectors of the economy. This has favored the ICT projects in public schools and higher institutions of learning in Djibouti as compared to Ethiopia (*afrol News on 14 December, 2013*). A more functional region power market is believed to reset much of these ills. When power flows freely across the Ethiopian-Djiboutian border, prices will adjust and power supply will increase, economists hold. Those willing to pay more for power in Ethiopia, can buy the imports from Djibouti, which in any way will have to become cheaper to compete with electricity produced in Ethiopia (Neyland, E. 2011). The existing market and distribution network in Djibouti and possibilities to sell power at higher prices will further promote investments in developing new and well equipped ICT projects across all her Education systems.

According to the National ICT in Education Strategy of 2006, most secondary schools in Kenya have some computer equipment but only a small fraction is equipped with basic ICT infrastructure necessary for teaching and learning. The same document estimates that there are about 150 students per computer. The situation is further aggravated by the fact that most schools use less than 40% of the available ICT infrastructure and furthermore, very few

schools are using ICT as an alternative method for the delivery of the education curriculum (MHEST, 2010). Oloo, L.M. (2009) suggested that the parameters to be looked into when accessing the ICT readiness for an institution include; infrastructural availability like electricity, access to infrastructure, manpower availability, policy and regulatory framework. In Kenya, one of the major cited hindrances to ICT integration and use in schools is lack of electrical power (Kenya Data Profile, 2010). A report by the World Bank, (2013) shows that most schools in Kenya up to date are still not yet connected to electricity; Kenya being a developing country, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools that fall under such areas are left handicapped and may not be able to offer computer studies nor are they in the position to adopt new ICT projects in play. According to UNESCO (2010), not even the public has been left out in this menace, as the report maintains that, with limited access to electricity, about 30 percent of the Kenyans are able to access computers with only 04 percent coming from the rural and remote area that are greatly and adversely affected by no electricity supply. According to Hutchison, A. and Reinking, D. (2011), frequent electricity interruption has been a hindrance factor in ICT projects in Nigeria and Sub-Saharan Africa where Kenya is included. Regular blackouts are very common in Africa especially in areas where electrical grids are either from a neighbouring country or where power is given on rationing terms. A study by 'The Connect To Learn Program' (2013), pointed out that as much as electrical grids were laid in most schools in Kenya and Uganda, there was this issue of unreliability whereby power blackouts were very common thus making it difficult for administrators to rely on ICT.

Electricity failure has been a persistent problem militating against ICT application and use in Nigeria, Ghana, Uganda, Kenya, Indonesia among other developing countries (Adomi, 2005a; Adomi, Omodeko, and Otole, 2004; Adomi, Okiy, and Ruteyan, 2003). This makes the few schools with ICT facilities unable to use them regularly. For example, KPLC in the year 2006 came up with the Mulika Mwizi initiative that targeted people who were stealing transformers, electrical wires and transformer's oil leaving citizens with no electricity.

Emphasis by the MOE notes that; one of the biggest factors hindering ICT growth in general is lack of electricity. Figures from the MOE indicate that 75% of the secondary schools in Kenya have an alternative a source of electrical power which could be from the grid lines or from generators (that are much expensive to acquire and maintain) and 25% of the primary schools have access to electrical power. Bearing in mind that most of the schools are in rural Kenya, the government recognizes this constraint to ICT growth. For example, Government, in its effort to address the challenges in Northern Kenya and other Arid lands, will provide Kshs 200 million (€2 million) for the installation of solar panels at secondary schools (GOK, 2009). The launch of the Rural Electrification Authority (REA) serves as a good step in ensuring that electricity is widely available in rural Kenya. Closer collaboration between the two entities (REA and MOE) would go a long way in speeding up rural electrification especially in education institutions in these areas. However alternative power sources may need to be harnessed alongside mobile connectivity options (e.g. 3G) if the power of ICTs is to be truly leveraged to spur economic growth and address the challenges in the education sector (UNESCO, 2010; MoE, 2011a).

2.3.2 The Role of Structures in ICT Projects Implementation

The major school enabling structures to be considered are the buildings especially the computer laboratories. In January 2003 NARC government came to power and President Mwai Kibaki re-introduced free primary education which previously existed before the mid 80s when the government adopted cost sharing measures that led to a minor level of school fees charged by primary schools for text books, PTA, and extra curricular activities. Since 2003, education in public schools became free and compulsory (Kenya Constitution, Article 53, 2010). On learning that primary education had once again become free in Kenya, Kimani Maruge, an uneducated farmer and the world's oldest person to enroll in primary school joined Kapkenduuywo primary school in Eldoret at the age of 84. He was elected head boy at the age of 86 in 2005 (World Bank, 2010).

Due to the large increase in primary school enrollment the number of students seeking secondary school education has grown significantly. In 1963 there were of 151 secondary

schools and the total number of students enrolled was 30 120. As at 2008, there were about 3000 secondary schools and the enrollment is about 620 000 students. Of these, about 40% were female students (UNESCO, 2009). In 2008, the government introduced a free secondary schooling education program that targeted raising student enrolment to 1.4 million by the end of the year. The scheme proposed to pay tuition fees for students while parents would still be required to meet boarding school costs and school uniforms. This introduction of free secondary schools education at both primary and secondary level led to an increase of student's population in secondary schools significantly. The enrolment rate in secondary school stands at 43% for girls and 47% for boys (UNESCO, 2010).

According to the World Bank statistics 2010, the increase in transition rate from primary to secondary level of education called for more space particularly; new classrooms, dormitories, playing grounds, libraries, laboratories, toilets and even dining halls. The increase in students' enrolment in secondary schools forced some school to use their computer laboratories like classrooms and dormitories. A report in ICT for Africa Kenya Chapter, 2009 cited some incidences in Kitui central where schools like Chuluni girls and Yumbisye had to use their computer laboratories like classrooms due to the influx of students' enrolment and lack of sufficient classrooms (Kadzo, L. 2011). According to Kozma R.B. (2009), Schools have to be equipped with the necessary ICT infrastructure in order to provide the next generations with the needed tools and resources for access and use and to attain the expected skills. The major cited infrastructure in this report is the need for separate full equipped computer laboratories. Schools are equipped with different kinds of technological infrastructure and electronic resources available; hardware, software and network infrastructure but lack relevant full equipped computer laboratories (Afshari 2009). Mumtaz (2000) cited in Chigona, A., & Chigona, W., (2010) states that many scholars proposed that the lack of funds to obtain the necessary ICT infrastructure like: hardware, software, computers, computer laboratories and electricity in schools is one of the reasons teachers do not use technology in their classes.

The Kenyan government has made efforts to initiate ICT in schools through the e-learning in some public secondary schools. The government in the year 2009 through the MOE identified five public secondary schools within each district where e-learning was to be implemented and allocated Sh980 million for their ICT Infrastructure development under the Economic Stimulus Package -ESP (MOE, 2011b). The selection of ESP beneficiary schools within the district excluded national schools and was based on geographical distribution of schools within a district.

The fund was to cater for computers, projector, local area network, internet connectivity and training of teachers. According to the report published by ‘The Connect To Learn Program’ (2013), the government introduced funds for infrastructure but it did not give funds to build laboratories where these computers will be accessed from; a factor that has seen computers in schools like Ulumbi in Nyanza be placed at the school bursar’s shelves. In this move by the government, Kenya Institute of Curriculum Development (KICD) has been mandated by the government to provide digital content for e-learning (CIA World Factbook, 2009). A total of 1021 public secondary schools benefitted from ESP-ICT Fund countrywide and Kwale County had 15 schools (MoE, 2011a). Apart from national schools category which was not funded, the schools that benefitted from the ESP fund within Kwale County represent major categories of public secondary schools in Kenya including Lungalunga Secondary in the far coast. The selected schools included county schools, district (sub-county) schools and community (harambee) schools. Among the selected schools were girls boarding, boys boarding, and mixed day (MoE, 2011a). Though there are various reasons for failures in implementing ICT projects in public secondary schools, users’ technical skills, perception, infrastructure are critical to ICT projects implementation. To adopt ICT, schools should attain some level of physical infrastructure development while e-learning users should have necessary technical competency blended with positive attitudes and perceptions towards e-learning (Saekow & Samson, 2011).

The government of Kenya after realizing the importance of computer laboratories in schools gave a report through the MoE in 2014 that the Government is now considering a computer

laboratory model for every school to integrate ICT as opposed to laptop for a child proposal.(The House Committee on Education, Science and Technology,2014).In spite of all the effort the Kenyan government has put forth to introduce ICT in schools, a large number of public secondary schools are yet to implement ICT projects. According to NEPAD e-Africa Commission (2003), Ministry of Education, Science and Technology (MOEST), in partnership with three companies; Microsoft Corporation, Oracle Corporation and Digital Satellite Television (DSTV) did a pilot e-learning program implementation in Kenya in selected schools (Ayerre, Odera & Agak, 2010). Unfortunately, the report on e-Learning in secondary schools revealed that less than ten percent of secondary schools in Kenya offer computer studies as a study subject. Conversely due to e-Learning's impact on education, the government is determined to integrate the technology in public secondary schools countywide (Kadzo, 2011). Consequently, the government recently embarked on a multimillion ESP-ICT project in selected schools to initiate e-Learning and strengthen ICT projects in schools.

2.3.3 Computers in Schools' Role in ICT Projects Implementation

There have been more computer deployments and more concerted efforts to integrate ICTs in education since the ICT strategy was drafted. But the number of secondary school students has also risen quite dramatically due to FPE and FSE meaning that overall gains in deployment are most likely limited. Most computers are acquired by the schools through private donations or purchase from school fees. Interviews with officers from the ICT unit indicate that there were about 15,450 computers in 1,300 secondary schools in 2010. Reports from interviews and examination of documents indicate that there were more than 26,620 computers in education institutions which span across other institutions beyond secondary schools. As far as could be ascertained the criteria for placing computers in schools are: Adequate security, Electricity supply, ICT literate teachers and School management support (Ayerre, Odera & Agak, 2010).It was reported during the interviews that the MoE has set guidelines and standards for ICT deployments but these have not yet been circulated. The intention is to circulate them during this financial year. Quality assurance and control was

cited as a challenge due to budgetary constraints and the limited capacity of officers on the ground. This means that schools would most likely acquire what they could afford and the inspectors are not yet capacitated to enforce any standards in as far as ICTs are concerned.

The ICTs in schools are widely used for basic literacy skills acquisition, teaching of ICT as an examinable subject and for subject specific teaching for those with digital content. The following are notable deployments done to increase the number of computers in schools: The MoE disbursed Kshs 1.5 million (€15,000) to 213 schools which were evenly distributed across the country's 71 districts in 2006. This money was to be used by the school-based education managers to acquire 25 new computers per school, one printer, and educational software, sensitize ICT teachers on technical maintenance, and buy a printer and the acquisition of a school management system. Computers for Schools Kenya (CFSK)⁴⁰ has been reported to have installed about 18,000 computers in over 600 educational institutions each receiving about 20 computers, The ICT Trust Fund provided about 200 schools with computers with each school receiving 20 computers, The NEPAD e-Schools project provided 6 schools with 20 computers each, and, The Rural Schools Project⁴¹ which is the other active member of NICE indicated that they have provided over 4,500 computers to a number of unidentified schools (GOK, 2009).

In the most recent budget (2009-2010), funds were allocated for the purchase of digital laboratory buses for each district. This will be achieved through the Economic Stimulus Programme. It was reported that this initiative is under the Ministry of Information and Communication and is aimed at fast tracking schools in each constituency and increase the number of computers in each selected schools. A report by Computer for Schools Kenya 2013, says that for ten years that it has been in existence, CFSK has sourced over 120,000 personal computers that have been deployed in over 8,500 Public Secondary and Primary Schools, Technical Training Institutes, Teacher Training Colleges, Medical Training Centres and several Universities. It also operates a comprehensive preventive and curative maintenance programme for these computers to ensure they are fully operational all the time.

In a number of these institutions, it has also placed electricity generators, Internet access and the World Space Direct Media Service. The computer, computer hardware and software form a major component in ICT projects in education. This is due to the fact that major ICT projects revolve around a computer. Lack of sufficient computers in educational institutions has been a challenge that the government through the MoE, CFSK, World Bank, NGOs, MOEST, MHEST and NCST is targeting to address in its vision 2030 plan (MHEST and NCST, 2010).

2.4 The Role of Administration in ICT Projects Implementation

Research shows that investments in ICT for enhancing formal and non-formal education systems are essential for schools improvement (Tubaishat, A. and Lansari, A. 2011). School leaders/principals are chief accounting officers in their schools and therefore are concerned in allocating budgets to various school activities including implementation of ICT projects. According to Becta (2010), implementation of ICT projects in schools would be successful when school leader supports, learns, provide up to-date infrastructure, adequate professional development and support staff during its implementation. School leaders have the responsibility of supervising implementation of ICT programs in their schools. A study carried out by Anderson & Dexter (2010) on technology leadership behaviors of school principals established that, apart from ICT infrastructure being important in school, school leadership was the most determining factor in the process of effectively implementing ICT projects in schools.

More research support the idea that school leadership behavior determines success or failure of schools to implement ICT in its activities (Aguyo, 2010, Chang, Chin & Hsu, 2012). Therefore, school leader's behaviors are is important in implementation of ICT in schools. According to Kidombo, H.J. (2009), leadership behavior of educational managers has a positive role in determining the process of ICT implementation in education. A positive behavior towards ICT would set clear visions and good conditions for its implementation. In schools, positive behavior towards ICT would manifest itself by the way the school leaders use ICT and encouraging others to use it. For efficient implementation of ICT in schools,

school leaders must address challenges of implementing new technologies, starting with their own challenges. However, due to many challenges in implementing ICT projects in schools in sub-Saharan Africa, school leaders find themselves in a situation that requires them to understand and undertake some of these challenges. Failure to meet these challenges would mean many schools would not be able to effectively implement ICT in their teaching and learning activities. This would mean further widening knowledge gap, deepening existing economic and social inequalities between those who have access to and control technology and those do not.

Kenya Vision 2030 (GOK, 2007) implied that ICT could be used to propel the country to a middle level economy by improving security, lowering cost of doing business and providing Kenyans with a friendly working environment among others. Specific strategies were to include improving the quality of education by providing quality teachers, space and technology for delivery. Key to this was implementation of ICT in schools. Despite its importance and the strategies developed by the government on implementation of ICT in schools, research have established that many of them are not effectively using ICT to support learning, teaching, research and management as intended by Kenya National ICT policy. Kweyu, E. (2009) revealed that despite efforts made by various stakeholders and the importance of ICT in education sector, the National ICT policy have to a large extent remained in draft form. No attempt is made to implement the policies to schools. Therefore, the influence by administration can be discussed as follows.

2.4.1 Role of School Leadership's Vision and Strategic Planning

School leadership should have clear visions and strategic plans for implementing ICT in their schools. Without clear vision and strategic plan by school leader, in implementation of ICT, it is likely that there would be poor coordination of activities and only enthusiast teachers' would battle to implement it to support learning. School leadership vision and strategic plans for ICT should be driven by pedagogical and not technological considerations (Akaslan, D. and Law, E.L.-C., 2010). A report by UNESCO (2009), warns of dangers of technological

considerations where features of ICT drive decisions about its implementation in schools without pedagogical considerations. Technological considerations without a clear vision of how technology would affect learners have a danger of putting more effort on provision of ICT infrastructure rather than how ICT would help learners to learn. Technological thinking could be reduced through demonstrating clear visions, stranded with pedagogical understanding, and reflected in well constructed, short-term and long-term, strategic plans (Demirci, A., 2009). The power and potential benefits of ICT should be considered in relation to other elements of school planning. Cost of implementation, staff ICT skills and development, benefits of implementing ICT in relation to other technologies, availability of electricity, school capacity to sustain implementation, among others, should all be considered during planning of implementation of ICT in schools by school leaders’.

2.4.2 School Leadership’s Role Modeling in Implementation of ICT Projects

School leaders are essential to creating a vision that empowers school community in setting to work cooperatively toward achieving instructional goals. Kompf, M. (2005; 2009) observed that school leaders who are visionary, imaginative and inspirational help to develop same qualities to their staff in school. School leader’s visions of implementing ICT in school are realized through incorporating, developing and supporting visions of other school members. In order to effectively perform duties of school leadership, school leader’s roles should be geared in using ICT in school. They should demonstrate skills of using ICT in their day to day activities in school. They should be prepared to learn how to use ICT, but as learners, their understanding and competence in ICT need not be so complicated. Basic skills in using ICT are desirable. However, Broadley, T. (2012) found that some school leaders’ were not competent in basic ICT skills, though Gurr (2010) insists that present school leader should demonstrate some basic understanding of ICT in order to perform their duties effectively and inspire the school community to implement it. By using ICT, school leader demonstrates to school community that its implementation is important and he/she acts as a role model. According to Castro Sánchez, J. J. and Alemán, E. C. (2011), school leadership

ICT role model for school community, is important in implementation of ICT programs in school.

Bingimlas, K. (2009) argued that school leaders' who demonstrated high standards of profession modeled expectations of staff and students to perform their best. Though school leader acts as a successful role model to school community during the process of implementing ICT in school, he/she should not be seen as the expert in ICT use. School leader acts as a link between staff who are ICT expert and the school. Chigona, A., & Chigona, W. (2010) observed that school leader could act on advice from staff members competent in ICT during its implementation. The author asserts that it is sensible for school leader to seek assistance from other members of staff when making plans on how to implement ICT. School leaders demonstrating to be ICT experts while their ICT ability is not of high standards, would be unable to effectively implement ICT in their schools. They should model staff competent in ICT to take charge in its implementation, while they supervise the process (Bingimlas, K. 2009).

2.4.3 School Leadership in the Provision of ICT Infrastructure in Schools

Lack of ICT infrastructure is a serious obstacle to implementation of ICT in schools, especially in developing countries like Kenya. Without these infrastructures, Kenya would not be able to implement ICT to schools to levels expected or required. ICT infrastructure planning and investments are therefore critical if Kenya's huge economic and developmental potential are to be realized. Key in helping schools implement ICT is careful construction of a sustainable infrastructure that could assist to turn the situation around. School leaders are the custodians of school infrastructure, including ICT infrastructure. School leaders are concerned with providing adequate and relevant school infrastructure (Ajayi, L., 2009).

It is the responsibility of school leader to make provisions of acquiring up to-date ICT infrastructure. Schools with up to-date ICT infrastructure encourage faster information sharing thereby creating less hierarchical and flexible organization, hence a more flexible learning environment within the school. School leaders, who recognize this, understand that

their school could be more efficient and transformative (Grono, 2010). On this regard, school leaders should be in the forefront in championing implementation of ICT by involving all stakeholders in provision of ICT infrastructure in their school. They should actively lobby development partners and government to support implementation of ICT in their schools. It is the responsibility of school leaders to inform parents about expenses and importance of implementing ICT in school in order to encourage them to support the programs. By providing adequate and up to-date ICT infrastructure, there is likelihood of staff professional development where staff learns as they use them in the process of teaching in school. This creates a good working school environment where staff and students feel valued and cared for (Hennessy, 2010). Provision of up to-date ICT infrastructure in school would be a motivation for school staff not competent on ICT skills to train on them. Grono (2010) observed that, the method of providing ICT infrastructure before staff undergoes training is becoming a popular approach in implementation of ICT in schools. More schools are increasing ICT infrastructure without sending their staff for in-service courses, such as supplying computers to classrooms so teachers are encouraged to try them. Through regular and consistent use of ICT, school leaders who are not competent in its use could develop the required skills.

School leaders should ensure that their offices have a computer and indeed they access it regularly, this way, they can learn more about the technology and therefore be able to encourage their school to adapt it. Unfortunately, very few school leaders in public secondary schools in Kenya have a computer in their office, most especially in mixed day secondary schools, where security of their offices is not guaranteed. Few mixed day secondary schools have a computer in bursar/secretary office. It should be noted here that the establishment of mixed day secondary schools in Kenya has expanded rapidly since the introduction of free secondary education. Most of these schools have taken over offices and classrooms previously used by the primary schools (Andiko, 2009).

2.4.4 Distributive School Leadership in Implementation of ICT in Schools

Distributive school leadership involves leadership tasks of school being done communally by all members in a way that strengthen the whole school community, increasing a sense of commitment and collective responsibility while making tasks more manageable. Individual centered leadership is not appropriate in implementation of ICT in schools. Implementation of ICT in school should stem from a common vision concerning involvement of the whole school (Orodho, J.A. 2009). Haverila, M. (2011). observed that a distributive school leadership is emerging in schools due to implementation of ICT; hence promoting further school leadership reforms. School leaders should delegate some roles of implementing ICT in school to other staff members. This would promote the personal belief by the staff in the importance of implementation of ICT in the school. The delegated ICT staff supplies school leader with advice on implementation of ICT in school. The school leader with cooperation of delegated staff and other school members can come up with ICT visions and plans, which can successfully help in implementation of ICT in school. Kadzo, L. (2011) argues that school leader who delegates some responsibilities of leadership to his/her subordinates helps create school environment where all members participate in decision making. This way, school leader empowers his/her staff to develop, create and own shared positive visions that are important in implementation of ICT. Therefore, it can be argued that encouraging others to lead imposes greater responsibility and initiatives on them.

A distributive school leader develops leadership skills to other staff members through delegation of some leadership. Delegating power within the school creates environment where staff share, work and learn together, leading to a collective purpose and universal goal. Unfortunately, research as established that the notion of distributed school leadership does not exist in many schools, though (Gurr, 2010, Hennessy, 2010 and Awouters, V. and Jans, S., 2009) argued that through distributive leadership, differences between leaders and followers are minimized, hence opening opportunities for school staff to have a common stand regarding implementation of ICT in school. Delegation of leadership, common decision making, provision of up to-date ICT infrastructure and professional development, motivates

and empowers teachers. By empowering teachers to own the process, the school leader set educational goals for implementation of ICT in school by involving them in championing, promotion and development of ICT. This means that school leader leads the implementation of ICT in school without himself/herself being ICT expert. This way teachers' gets recognition for success, giving satisfaction and possession of directions and decisions arrived in school (Ayer, M.A.; Odera, F.Y. and Agak, J. 2010).

2.4.5 Transformational School Leadership in Implementation of ICT in Schools

Transformational school leadership is a type of school leadership style that leads to positive changes in school staff and students. Transformational school leaders are usually active, passionate and enthusiastic. These leaders are concerned and involved in the process of implementing ICT as well as helping all school members realize the dreams of ICT. Transformational school leader delegates' responsibility, shares decision making, promotes staff professional development and maintains a clear vision in school. This leader is capable of influencing others by aligning ICT vision with values of the school (Watkins, N. 2009).

To be able to implement ICT in school effectively, school leader should be able to set goals, organize, manage, monitor and build relationships with other members of school community. He/she should be people centered who is able to model standards and practices consistent with culture of the school. Spence R. and Smith M. (2009) argued that transformational school leader should be a person having ideas for school that are allied to the school's standards. The author notes that, these are collective ideas that uplift teachers' and students' excitements, aspirations, provides principles for the school and allows school community to work together. School leader who is able to build and convey these ideas in form of an essential vision in his/her school displays an important leadership characteristic.

Transformational school leader should be able to raise the level of individual conducts that they are creative thinker, with a dedication to performance, professionalism, principles and standards. School leader's vision sets goals to be attained during implementation of ICT. Sweeney (2012) outlines the qualities of a successful school leader as the capability to lead

change with clear vision and ICT skills. A vision that focuses in the implementation of ICT in school creates interest within the school that it cares about students learning. A vision for implementation of ICT in school should focus on: Planning, organizing and funding, Staff development and ICT infrastructure, Implementation, improving access and equity, Maintenance and sustainability of ICT infrastructure in schools, Legal and moral issues of ICT in school, Education theory, pedagogy and curriculum improvement and General School administration (Samad A.A., 2009). The essential aspect of being the school leader is about dedication to set visions, to work and cooperate with others in bringing these visions to realization. Schools try to implement ICT into their operations to improve students' learning by presenting flexible learning opportunities and improving school activities. Not only ICT improves student's learning but the whole school community requires being ICT competent. ICT in schools is emerging as an essential factor for schools to operate effectively and efficiently as organizations and as a teaching and learning tool within the school community. Further, school leader could use ICT as tool for monitoring the situation in his/her school. Thus, ICT could be used as a tool of management in school (Oloo, L.M. 2009).

2.4.6 Studies on School Leadership Supporting Implementation of ICT in School

Researchers have argued that school leadership is a stronger predictor of teachers' use of ICT in teaching (Bingimlas, K., 2009). School leader who implements ICT programs and shares a common vision with teachers stimulates them to use ICT in school (Farrell, G. 2010). For effective implementation of ICT in school there should be a strong school leadership to drive a well-coordinated and designed ICT plans. As quality of school leadership improves, so does likelihood of schools implementing quality ICT. Effective school leadership focuses on ICT infrastructure, ICT implementation, ICT leadership, learning theory, general teaching and general school leadership. (Farrell, G. and Shafika, I .2009) conducted a study on factors that influenced implementation of ICT in eight schools in Hong Kong and Singapore. Their study revealed that leadership interest, promotion, collaboration, experimentation and teachers dedication to student-centered learning influenced implementation of ICT in school. Another study by Park, N. et al. (2009) in 80 Singaporean secondary school teachers, found

that school leadership with qualities of identifying and articulating a vision, promoting recognition of common goals, providing individualized support, offering academic encouragement and strengthening school culture, influenced implementation of ICT in schools.

A further study by Afshari (2012) on 30 school leaders in second-cycle institutions in Tehran, revealed that, relationship between school leader's level of computer competence influenced implementation of ICT in schools. These studies reveal that school leadership interest and competency in ICT could help improve implementation of ICT in schools by teachers. Another study by Yuen, Law & Chan (2011) in 18 schools in Hong Kong, found that school leaders are key change agent, exhibiting visionary leadership, staff development and involvement in implementation of ICT in schools. School leader should share ideas with other staff while focusing on implementation of ICT in schools. Trucano, Michael (2010) observed that institutions exemplified by executive involving subordinates in decision-making, strengthened by ICT plans, effectively implements ICT in education.

2.4.7 Situation of School Leadership Challenges in Implementation of ICT in Schools.

Research indicates that effective school leadership makes a huge difference in student performance and assisting staff to implement change. The demands of a changing society have placed enormous demand on school leaders to make a change in the way they manage their schools (Yonazi, J. 2009). Technological changes over the past 20 years in Kenya have impacted society and subsequently school environment. Requirements for accountability in managing schools and meeting the needs of all students and teachers, coupled with demand of a digital society require a change in the way schools are managed in Kenya. Some school leaders are committed to implementing needed changes. They understand the potential and role of ICT, when it is coupled with a focus on learning, for developing a capacity for relevance change, while others do not. School leaders who are not ready for ICT leadership transformation put a lot of effort to acquire ICT infrastructure (GOK, 2010). But when they provide them, very few, if any, use them in meaningful way; therefore lack the essential

visions and knowledge to lead implementation of ICT in their schools. As well as providing the needed ICT infrastructure, School leaders should focus on how infrastructure affects teaching and learning in their school. To achieve this, school leaders should recognize that, the idea to implement ICT in schools is not only for school use, but also a transformation of teaching and learning (Afshari, 2012).

According to OECD & PISA (2010) Kenya experiences many challenges in the implementation of ICT in schools due to the fact that it lags behind in information superhighway technology. In terms of telecommunication infrastructure expansion, development of fixed telephone network throughout Kenya has been below expectations. Therefore many schools lack fixed telephone networks, which is important for connectivity. While many countries have achieved up to 41% implementation of ICT in schools, the percentage remains considerably small in Kenya. Implementation aims at utilizing ICT to support teaching and learning in school in order to achieve enhanced education outcomes. Given that the government of Kenya has acknowledged shortages of teachers in its secondary schools, ICT could be the answer to this problem, where the few teachers available could share information with thousands of students in schools. School leaders should be aware of the potential of ICT to bridge the gap of shortage of teachers and other supporting staff in their schools (Oloo, L.M. 2009). Though school leadership is central to implementation of ICT in schools, few studies have been done in Kenya on school leaders' capabilities and technological skills needed for proper implementation of ICTs. This is the fact, despite the arguments by researchers that, school effectiveness, school improvement, implementation of ICT, staff development and motivation, students' achievements and generally school change depends on capabilities of school leaders (Sang, G. et al. 2010).

It is understood that implementation of ICT in schools, use of ICT in the wide public and provision of ICT infrastructure to Kenyan population is a recent initiative. Lack of "technology" leaders could therefore be a factor influencing the implementation of ICT in schools in Kenya (Sang, G. et al. 2010). For example, in a survey carried out by Kandiri (2012) in twenty one public secondary schools in Kenya, revealed that the majority

(eighteen) did not have well formulated procedures, plans or strategies for implementation of ICT in their schools. The study revealed that only expressed views and ideas of the ICT teachers were available. Schools lacked visions and strategic plans to maintain and implement ICT to the required levels. This puts interest, commitment and championing of school leadership to implementation of sustainable ICT programs in Kenyan schools into question.

2.5 The Role of Financial Resources in ICT Projects Implementation

World Bank (2013), defines financial resources as the money available to a business for spending in the form of cash, liquid securities and credit lines. Before going into business, an entrepreneur needs to secure sufficient financial resources in order to be able to operate efficiently and sufficiently well to promote success. Computers for schools and related ICT projects, are considered to be a form of business undertaking whose benefits are hidden in the long run achievements in efficiency and effectiveness management, teaching, administration and planning processes of school projects (OECD & PISA. 2010). The Global report on the Costs of IT 2013, indicates that the total money spent on IT worldwide has been most recently estimated as US \$3.5 trillion, and is currently growing at 5% p.a. – doubling every 15 years. IT costs, as a percentage of corporate revenue, have grown 50% since 2002, putting a strain on IT budgets. Today, when looking at companies' IT budgets, 75% are recurrent costs, used to “keep the lights on” in the IT department, and 25% are cost of new initiatives for technology development (Nut, J. 2010).

The World Bank (2010) reports that the average IT budget has the following breakdown: 31% – personnel costs (internal) 29% – software costs (external/purchasing category) 26% – hardware costs (external/purchasing category) 14% – costs of external service providers (external/services).The recent reports therefore indicate that both the developed and developing countries are heavily investing in ICT as the major economic driving force. A Report by the Global E-Schools and Communities Initiative 2009, tries to point out how financial resources is a key determinant of ICT projects. It states that, planning

and deployment of ICTs in schools today suffers from several major problems, for example, budgets only consider the immediate costs and seldom, if ever, consider the long term costs of purchasing, deploying and maintaining ICTs (Nut, J. 2010). For example, costs for replacements, disposal or even operating costs for refresher training, maintenance and technical support are often ignored. The sum of all this costs is Total Cost of Ownership.

Palak, D. and Walls, R. T. (2009) gives a brief history about the development of ICT in education and how budgetary allocations have continually influenced ICT projects in education. He argues that, among the technologies strongly associated with education, paper and book printing significantly pre-date the advent of mass education systems in Europe (1780-1870), while chalkboards (circa 1800) and modern graphite pencils (circa 1795) are technologies that have long been applied in education settings. In contrast, information and communication technologies (ICTs) are historically recent additions to the basket of discretionary (non-teacher salary) expenditure options that are available to those tasked with apportioning the education budget (Neyland, E. 2011). The potential for ICT to be applied in schools has radically increased from the mid-1990s. This is on account of the combination of massive improvements in computer processor power, information storage capacity and software utility; rising ubiquity of telecommunications services; the explosion of the Internet; and steadily declining relative costs of acquiring hardware, software and telecommunications services. In many, though not all, developed countries, these technological and cost advantages have accounted for mass access and use of computers in education (Nangue, C.R. 2010).

The same is not evident in developing countries, largely because the cost barriers to supplying ICT hardware, software and connectivity in these education environments are significant. In developed countries there is a growing realization of what in 1996 Oberlin called the 'financial mythology of information technology' which he described as follows: 'While the per unit price of information technology is declining rapidly, the total cost of owning and maintaining systems is steadily rising, the falling prices mislead many to expect cost savings that will never materialize' (Mbangwana, M.A. 2009). This was largely because

of consistent underestimation of the management, technical support, curriculum development and training expenditure that is essential to ensure sustainable ICT access and use in education. Given global enthusiasm for applying ICT in schools, higher education institutions and in national education systems, it is essential to put in place appropriate costing, financing and planning processes to aid budget allocation decisions.

In developing countries that have to deal with constrained budgets, financial allocations to ICT must properly take into account the full costs of sustainable ICT systems as well as address the challenge of providing ICT on an equitable basis (Kozma R.B. 2009). Education planners must investigate costs related to ICT so that key strategic questions around effectiveness, efficiency and sustainability can be better understood. Such an understanding is particularly important, given that sometimes wildly extravagant claims are made for ICT and its impact on education processes (UNESCO, 2009). According to Becta (2009), Ireland for example has taken a keen interest in ICT investment. Ireland has achieved enviable economic performance and growth over the past decade. But, in order to prepare the next generation to contribute to continued economic success and to participate in the new knowledge-based society, substantive and strategic ICT investment in our schools is now urgently required. The allocation of €252 million in the NDP funding, augmented by the additional funds and supports that have been indicated to the Strategy Group by the DES, is a very welcome development. It will allow schools to re-engage with ICT and to make significant progress towards ICT integration and the use of digital technologies and tools. In addition to the NDP investment it is estimated that a further €85 million will be made available for ICT provision in schools by the DES Building Unit and other sources within the DES (Kompf, M. 2005; 2009).

Together, these represent a potential spend of approximately €337 million. This is a substantial investment and will have a significant impact. However, given the numbers of schools and students and the existing levels of ICT, a Strategy Group on ICT in education regarded it as inadequate to fund progress beyond an acceptable baseline of ICT provision. Further investment will be required to get our schools to an EU average level of ICT

provision over the coming years. According to Bordbar, F. (2010), since the introduction of the ICT in Schools Initiative in 1998 in Ireland, the Government has made a substantial investment in the integration of ICT in teaching and learning. As manifested in the NCTE census, this investment has resulted in significant progress in the development of ICT infrastructure in schools. From the 2005/06 school year schools are being provided with broadband internet access as part of a joint project between the Government and the Telecommunications and Internet Federation of the Irish Business and Employers' Confederation. The local schools connectivity is being provided by means of a Schools National Broadband Network.

This network and the support services to schools are managed by the National Centre for Technology in Education and supported by HEAnet. The total costs of the Schools Broadband Programme, including the initial set-up and continuing costs to June 2008, are estimated to amount to approximately €30 million. The DES has provided financial support to schools for developing their infrastructure. The NCTE census sought to establish the level of expenditure by schools in addition to grants received from the Department. The response rate to the questions relating to expenditure by schools was relatively low, with the proportion of non-respondents ranging from 20% to 45%. As the report suggested, data on schools' expenditure must therefore be interpreted with caution. For schools that did respond to the relevant question, the average additional expenditure on ICT in the previous full financial year was €2,129 per school for primary schools, €11,583 for post-primary schools, and €5,679 for special schools. In relation to technical support, the average amount spent by responding schools was €741 for primary schools, €3765 for post-primary schools, and €1,239 for special schools. As the report notes, approximately one-third of spending on ICTs was allocated to technical support at primary and post-primary level and about one-fifth in special schools (World Bank, 2010).

In Nigeria, the impact of cost is considered in ICT projects by both the local and national government. Williams (2010) researched on ICT in education in sub Saharan Africa and looked at countries like Ghana, Nigeria and many more, whereby the idea of financial

resources were not left out. According to the research, successful implementation of ICT requires strong support from government at national and local level by relevant institutions and education authorities, as cited from: (Chigona, A., & Chigona, W. 2010). According to Sharma (2003 cited by Chen, R.-J. 2010), political strength of each nation affects the introduction of any new technology. He also explained that cost is an issue that defines and drives the adoption and growth of ICT especially in developing countries. Support mechanism in relation to ICT, it is needed to realize trainings and to promote gradual integration. Authors (Barolli, E., Gorishti, A., Karamani, B., Haveri, A. 2012) notes: It is very necessary while teachers face technical difficulties and may tend to revert to old methods of teaching. Lecturers need support in integrating ICT in curriculum and teaching methods: Related to (Tezci, E. 2011a), Educators who feel more support in the use of ICT that have available, use them better. High Cost of ICT Facilities attracted 83 respondents (47 percent) in a research carried out to assess the major determinants of ICT projects in secondary schools in Nigeria.

Cost has been reported as one of the factors which influence provision and use of ICT services (Kozma R.B. 2009). The cost of computers is too high for many to afford, to hire and maintain. Monthly Internet rates are exorbitant and the charges for satellite television are unaffordable for most people in Africa (Brakel and Chiseuga, 2003, cited by Kadzo, 2011). This has made it difficult for Nigerian secondary schools to acquire and install ICT facilities for the use of teachers and students. In Kenya as any other developing country, ICT cost in schools has never been an obstacle only but a central factor to successful school ICT projects. In Kenya high schools, the concept of Economic Stimulus Programme (ESP) came into existence and public limelight in the 2009 /10 Budget speech to parliament. The government allocated a total budget of Kshs.22Billion for it with the aim of boost economic growth and led the Kenyan economy out of a recession situation brought about by economic slowdown. The key objectives of the economic stimulus included among others improving infrastructure and the quality of education and health care, stimulating economic activity and creating employment opportunities. ICT in education is the application of Technology in pursuit of

relaying of information from the instructor to the students. It has many advantages such as improving the retentive memory of students as images can easily be used in teaching, teachers can easily explain complex instructions and ensure student's comprehension, they are also able to create interactive classes and make the lessons more enjoyable which could improve student attendance and concentration, This results to improved academic performance (World Bank, 2010).

The reasons for introducing ICT in schools are 4 fold: Tech Innovations, Globalization of Economy and Information, Knowledge based economy and Society and Escalating Demand for Education (UNESCO, 2013). ICT Integration Manual was developed by Ministry of Education (MOE) to ensure resources were disbursed to beneficiary institutions with procurement, installations and capacity building of teachers in these institutions. The schools that benefited were under the category that was referred to as "pockets of poverty". The basis of undertaking the project in these regions which were classified as marginalized and poverty stricken was majorly to eradicate poverty through empowerment of people, deal with job insecurity and promote growth. Apart from classroom instruction, ICT is an administrative tool for teachers and administrators. Teachers are also involved in class administrative duties such as student record keeping, lesson planning, preparing handouts, tutorials and slides, preparing exams papers, marking papers and recording of results, performing some type of statistical analysis on marks, and so on (MoE, 2011a).

The researcher further expounds that administrators are also involved in a variety of work that requires technology, such as the computation of school performance for a certain year, keeping of records of employees, and preparation of school budget. Technology can therefore become an extremely useful tool in handling of a number of the administrative tasks for both teachers and administrator as well as in integration in classroom teaching. According to UNESCO (2009) report , there is need to equip school principals, administrative staff, teachers and students (the users) with the appropriate ICTs skills and advising principals and teachers on pedagogical issues in the use of ICTs. All users should also be provided with on-going support in using the technology platforms, content and applications. According to

Bingimlas (2009), financial constraints has been cited as a major hindrance to ICT projects implementation in education. Financial resources perform a major role of getting qualified manpower to champion ICT projects in schools, build computer bus classes/laboratories, buy the hardware and software of the computer, acquire the computer itself, cater for the computer maintenance and servicing expenses among others. According to Ahmed, (2009), poor financial support to ICT projects demoralizes the willing parties especially the project implementers leading to a poor attitude and mentality towards the projects that eventually leads to the projects' collapse.

The pace of ICT adoption in both public and private secondary schools in Kenya is very slow, as characterized by: user complexity perception, inadequate IT literacy, lack of psychological and technical readiness, insufficient policy guideline and constrained finances (Nchunge et al., 2012). Computers are still expensive in Kenya, in a country with a GDP of \$1600, majority of the individuals and schools cannot afford to buy a computer and consider it as a luxury item, more expensive than a TV. While 2nd hand computers cost as little as \$150 and branded new computers being sold at \$500 or higher. Little is known about the true costs of ICTs in education (GOK, 2010). There have been few rigorous costs studies, particularly in developing countries. Given current budgetary and resource constraints, a widespread investment in ICTs in education is probably not possible in most developing countries. It is, therefore, critically important to better understand the costs and benefits associated with ICT types and uses in various educational situations in order to effectively target scarce resources. There is some evidence, for instance, that computers may be most cost-effective when placed in common areas such as libraries and teacher-training institutes. One of the most cost-effective uses of ICTs in education may be their role in improving organizational and systemic efficiencies, including combating corruption (Ayere, M.A.; Odera, F.Y. and Agak, J., 2010).

The Ministry of Higher Education, Science and Technology, examined the cost of computer maintenance and came up with a report that, the cost of computer maintenance is high. Schools work on a constrained budget that is highly regulated by the government. Any extra

charges are restricted while on the other hand there is very little support by the government in the support of ICT programs in schools which includes poor staffing in the schools (GOK, 2010). Cost of computer accessories is high as the principals disclosed. To save on these costs they are forced to develop policies restricting the use of computer related materials which further disadvantages the teachers and the students. The MHEST and NCST (2010) also revealed the financial constraints in the integration of ICTs in schools has forced many schools to have computers donated into schools and just be placed in common classrooms where they are being worn out due to lack of relevant personnel, software, anti-virus and other maintenance related issues (MHEST, 2010).

The Kenya Budget Speech read by Hon. Uhuru Kenyatta in 2009 showed how much the government committed itself towards funding education, a case that saw computer projects and related ICT initiatives being introduced into the secondary schools. According to the speech that talks of Education funding, the education and training sector receives the largest share of government spending. About 73% of the government's social sector spending and 40% of the national recurrent expenditure goes to education. This translates to 7 % of the GDP. The Ministries disperse funds directly to the schools or institutions, a practice which is seen to ensure greater ownership of resources by communities and institutional managers and minimizes wastage of resources. As an example of government spending on education, in his budget speech delivered to the Kenyan National Assembly on June 11th 2009, the Deputy Prime Minister and Minister for Finance, Hon. Uhuru Kenyatta, indicated the following allocations to the education sector (GOK, 2010):

Table 2.1- Education National Budgetary Allocation (2009/2010)

Allocation	Kenya Shillings	Euro Equivalent (1 Euro = 100 Kshs)
Free primary and secondary education	1 billion	10 million
Upgrading primary schools	1.5 billion	15 million
Construction of centres of excellence in secondary schools	6 billion	60 million
Recruit additional 10,500 primary school teachers	1.3 billion	13 million
Recruit 2,100 secondary school teachers	353 million	3.53 million
Purchase digital laboratory buses for each district	1.3 billion	13 million

Source: (GOK, 2010).

Although education takes such a substantial portion of the national budget, the ICT in education sector still remains under-funded. This is because most of the spending in education goes to recurrent expenditure in the form of teachers' salaries (e.g. the Ministry of Education spends 86% of its budget on teacher salaries) and school feeding programmes. This leaves a big gap in capital development in areas such as ICT infrastructure and teaching and learning materials. This funding gap is filled mostly through development partner (donor) funding. According to the World Bank (2010), there are two categories of development partners working with the sector: pooled funders namely DfID, CIDA, UNICEF, and ADB who disburse their funds through direct budget support to the sector, and, project funders who fund specific projects. VVOB is one such development partner whose specific focus is on ICTs and integration. USAID works under the ICT/GDA alliance as discussed later in the document. It was stated that theoretically USAID is a pool funder but practically it disburses its funds directly to those involved in the implementation of the ICT/GDA projects. In line with the Paris agenda to harmonize and coordinate donor funding, the donors have formed an Education Development Partners Coordination Group –EDCG (UNESCO, 2010).

2.6 Stakeholders' Role in ICT Projects Implementation in Schools

Multi-stakeholder partnerships (MSPs) and other partnerships e.g. public-private partnerships (PPPs) have become important vehicles for drawing together the resources and know-how needed to make progress in a specific field or area especially in the newly introduced idea of ICT in education. They are formed to expand the reach, improve the quality, increase the supply, and/or improve accessibility of services to identified beneficiaries/communities (Akaslan, D. and Law, E.L.C. 2010). A multi-stakeholder partnership in the e-schools and ICT in education context can broadly be defined as a partnership that exists when government officials or agencies join with the private sector, civil society, professional development and training institutions, technology and telecommunication providers, educational content and ICT application developers, teachers, parents and learners to work towards and attain a shared goal (World Bank,2013).Such partnerships may have the following characteristics: Bring together diverse partners representing different groups and/or interests ,Partners work together, have a shared vision, and work towards common goals and objectives, Partners have a comprehensive and coordinated approach ,Each partner contributes something to the process, e.g. time, funding, expertise, and/or other resources,and,Decision-making and management responsibilities are shared (though there may be a secretariat coordinating and monitoring the activities of various partners).

According to the MOE HR (2010) report, there are many stakeholders in education in Singapore, each of whom needs to play his role effectively in order to help all our children learn better and reach their fullest potential in ICT.This document spells out the roles of the respective stakeholders in education. The statements which are student-centered, outline the roles and qualities we expect of each stakeholder—the child himself, his parents and family, his teachers, his Principal, MOE HQ, the Community,—in helping the child learn ICT as he/she grows. With these statements there will be a common understanding of the type of partnerships that can be undertaken and how the respective roles can be fulfilled. At the heart of these statements is the ultimate aims of helping all our children achieve the Desired Outcomes of ICT integration in Education (Awouters, V. and Jans, S. 2009). According to

the report published by World Bank 2010, Singapore classified the roles of the various stakeholders in ICT for education as follows and each stakeholder was seen to have a major role to play as follows: Students who were seen to value ICT education and want to learn, desiring to get the most out of the experience schools offer, Stand firmly by what is right, having understood what is right and wrong from parents and teachers in regard to newly adopted ICT, Respect authority and have a sound sense of civic responsibility, Work well independently and with others, with purpose, passion and pride in their work and Demonstrate spirit of caring and sharing towards others (Akaslan, D. and Law, E. 2010).

Students are now more frequently engaged in the meaningful use of computers (Castro Sánchez and Alemán, 2011). They build new knowledge through accessing, selecting, organizing, and interpreting information and data. Based on learning through ICT, students are more capable of using information and data from various sources, and critically assessing the quality of the learning materials. ICT has developed thus, students' new understanding in their areas of learning (Chai, Koh and Tsai 2010). ICT provides more creative solutions to different types of learning inquiries. For example, in a reading class, e-books are commonly used in reading aloud activities. Learners can access all types of texts from beginning to advanced levels with ease through computers, laptops, personal digital assistants (PDAs), or iPads. Castro Sánchez and Alemán (2011) encourage students to acquire specific technical skills to facilitate learning in ICT environments.

According to the Budget Speech (2009), Parents/Grandparents were seen to: Support schools in their efforts to acquire ICT and educate the child, and, Show care and concern for their children/grandchildren by being interested in what they do especially in the newly adopted ICT for schools. This was arrived after major discoveries that most students never used the available ICT for knowledge acquisition but for things like computer games and social networks that aren't beneficial to the life of a student. Also, the parents perform a major role in determining the projects to be undertaken since they are the major stakeholders who contribute cash and other resources through school fees and donations though charged in a monthly check off system in Singapore. Teachers are also charged with the responsibility of

inspiring love for ICT for Singapore in students, Care deeply for the character and moral development of students by word and example when touching on crucial issues in ICT education, Promote teamwork, enterprise, innovation and creativity in students, Motivate, challenge and help students find the potential within themselves, and, Seek to learn continuously by integrating the ICT ideas (MOE HQ, 2010).

Principals on the other hand are considered to be major stakeholders (Bishop, 2012). They are effective translators of ICT in educational policies into practices, interpreting and applying these appropriately to suit school conditions. The school principals in Singapore are seen as CEOs who lead by example thus conveying a deep sense of mission that embraces ICT in the education system. They build a supportive community by forging links with parents, alumni and the community. Creation of an environment to nurture growth and learning for staff and students as far as ICT is concerned, is a major role played by the school heads. The school heads also facilitate sharing of vision with parents and students that target at improving ICT integration in schools (Haverila, M., 2011).

A report by MOE HQ (2010), on Singapore ICT levels in schools spelled the major roles played by the MOE HQ as a major stakeholder in integrating ICT in schools as follows: Sets the strategic directions for schools, Collaborates with schools to formulate effective policies and practices, Supports principals and teachers to do an excellent job, Works in tandem with schools to inform and clarify policy positions to the public, Supports teachers in helping their students achieve the Desired Outcomes of Education (DOEs), Collaborates with other government agencies and non-governmental organisations to formulate effective programmes and practices that are geared towards ICT adoption in school (Castro Sánchez and Alemán 2011). The community plays a role in ICT integration in Singapore whereby: It welcomes and encourages the young to be involved in the life of the community and elevate the ICT levels of the community, upholds and transmits the right values and attitudes to the young as far as the dangers of the newly adopted ICT is, recognises the variety of abilities and talents displayed by the young and sees the worth in each child, offers scholarships and bursaries to

students and teachers who want to pursue higher in ICT, provides support to families and students who are in need of assistance in the field of ICT education (Haverila, M., 2011).

According to the World Bank (2009), Singapore has involved the local Business/Industry sector in achieving the implementation of its ICT policy and it has come up with major success. The Business/Industrial sector is mandated to carry out the following duties in education: Provides opportunities for the young to experience the world of work through employment and industrial attachments in the ICT departments, Collaborates with schools to formulate effective programmes for the young such as offering ICT work related projects and donating either direct funds or ICT enablers into schools, Supports placement opportunities for the professional development of teachers and Offers scholarships and bursaries to students and teachers who are ready and willing to advance in ICT world (ITU, 2010).

Alumni Associations are major stakeholders in ICT projects in Singapore education too. They perform major roles that are never limited to: Demonstrating loyalty and responsibility for future generations by supporting the school ICT projects, Provide the school with a sense of history, Act as mentors and role models to students in the school, Offers scholarships and bursaries to students and teachers (Lange, Peter, 2010). School Advisory/Management Committee are major vocals in schools decision making. According to (Lewis, Charley. 2010), these advisors are charged with the mandate of giving direction on the type of decisions to be made and how they influence the future of IC integration in schools. The school advisory also: Serves in an advisory and voluntary capacity to support ICT school programmes, functions and activities, Offers sponsorship and helps the school raise funds for developmental, infrastructural and ICT related activities to benefit students and staff, Provides links and encourages networking between the school on the one hand and the community, industry and parents on the other for mutual benefit and quality education, Acts as role model of active citizenship for students who have relevant desired ICT knowledge and Provides moral support and encouragement to the Principal and staff.

However, stakeholders in the developing countries differ from country to country. In Ghana for example; the education system touches on a number of stakeholders during its ICT for schools program (MOE, 2009). It calls them Partners in education and underlines them as follows: Ministry of Education (MOE): The overall responsibility for ICT policy and its implementation belongs to the MOE. To maintain institutional arrangements and integrity, the Ministry may assign the implementation of specific strategies to any of its agencies. These agencies and all schools will have to implement and deploy systems in accordance with the stated ICT policy and any related regulations (MOE, 2009). National and International Development Partners: The funding of ICT in education initiatives at all levels is the prime responsibility of the Government of Ghana as the major stakeholder in education. The Government provides funds for the acquisition of ICT resources, putting the necessary infrastructure in place (especially in the rural areas), maintenance of the resources, and training the required manpower and other related activities (FCC, 2010).

It is unlikely that the Government can finance acquisitions solely from its resources and that other sources should be explored. This naturally calls for the collaboration with the National and International Development Partners (Private Organisations, Development Partners, NGOs, the Parent Teacher Associations (PTAs), Old students Associations) in the introduction of ICT into education (ICT4AD, 2010). The roles of these Partners could be summarized as follows: National Development Partners perform the functions of contributing to the funding for, and purchase of equipment, and also facilitating in the building and refurbishing of ICT Centres. They can also provide incentives for teachers who support ICT in education efforts in the schools (ICT4AD, 2010). International Development Partners on the other hand could provide financial support and technical direction to the programmes and projects which are being developed. Several development partners are already supporting ICT in education initiatives and programmes. These Partners include World Links for Development Programme, GLOBE Programme, DFID, World Bank Institute, GESCI, UNDP, USAID, SchoolNet, Computer Aid International, among others (UNESCO, 2010).

National ICT in Education Coordinating Committee performs the roles of recognizing the crucial role of partners in implementing these changes; the Ministry will see to include a wide cross section of stakeholders in the process leading up to the development of the draft policy (World Bank, 2010). The Ministry remains committed to using a similar consultative approach in developing the implementation plan for the policy as continuing to build a shared vision and soliciting active input and commitment from all stakeholders is seen as an essential part of the process. Towards this end, the MOE has established an ICT in Education Coordinating Committee to oversee the development of an integration plan to support the ICT in Education Policy objectives and strategies (GOK, 2009). This apex national body will essentially provide guidance in the entire implementation process and will serve as an advisory body in an effort to: Provide support and input for the development of a detailed implementation plan, addressing goals, objectives and strategies as outlined in the ICT in education policy, including the financing of the policy; Strengthen and influence the work of the MOE in creating an enabling sector environment in which the objectives of the ICT in Education Policy can be met; Integrate new and existing efforts of different partners at an appropriate level of decision making and implementation of programmes and projects into an accountable, transparent and participatory way to ensure a maximum degree of good governance (Amega, S. et al. 2009).

In Kenya, stakeholders in education who have contributed greatly to ICT projects in schools range from ,students ,teachers ,parents ,Board of Governors ,parent teachers association, school administration ,the government ,NGOs ,political leaders ,religious leaders among others. To foster a better understanding of the roles of the stakeholders in the educational arena, the research attempted to explain the roles distinctive educational stakeholders-school board members, superintendent/DEOs, Central Government, site administrator, teachers, parents, and students-who are closely involved in the overall operations of schools (CCK, 2009).

2.6.1 School Board Members

In the management of education in Kenya, at secondary schools, middle level colleges and TIVET (Technical, Industrial, Vocational and Entrepreneurship Training) institutions are managed by boards of governors (BOGs) and universities by councils (MoE, 2011a) .These bodies are responsible for the management of both human and other resources so as to facilitate smooth operations, infrastructure, development and the provision of teaching and learning materials (Sessional Paper No. 1 2005: 63). In some countries these bodies are known as School Governing Bodies (SMBs). In the Kenyan case management of secondary schools by boards of governors (BOGs) came into place after independence following recommendation by the Kenya education commission report of Ominde (Republic of Kenya, 1964 cited by, Kadzo, L. 2011).

This aimed at giving each school its own personality and decentralization of authority for effectiveness. Education act Cap. 211 and sessional paper No. 1 of 2005 state that the boards of governors have been given the role of managing human and other resources so as to facilitate smooth operations, infrastructural development ,projects evaluation and provision of teaching and learning materials (MOEST, 2005; Kamunge, 2007). In sessional paper No. 6 of 1988, the government accepted the recommendations of the presidential working party on manpower training famously known as Kamunge report that: Members of boards of governors and school committees be appointed from among persons who have qualities of commitment, competence and experience which would enhance the management and development of educational institutions (MOEST, 1988; 2005; 2010).The education act Cap. 211 of the laws of Kenya section 10 (Republic of Kenya, 1980 cited by, World Bank 2010) indicates that the minister appoints members of the boards of governors through a selected committee comprising of provincial administration, local leaders, members of parliament and local councilor, sponsors, local education officer and the head teacher. This committee selects 3 persons representing local community, 4 representing bodies and organizations like sponsor and 3 representing special interest groups .Once officially appointed by the minister,

the 10 members select the chairperson of the board and co-opt 3 other persons from the parent's teachers association (PTA) into the board (CCK, 2009).

From 1980s, the ministry of education in Kenya has provided in-service management training for principals of schools. In 1988, the government of Kenya (MoE, 2011b) established Kenya education staff institute (KESI) to offer in-service training for heads of educational institutions including school principals. Further, the KESI mandate was to be diversified both serving and potential school leaders. However, although it has been existence for almost 2 decades, the institute provides in-service to other school leaders such as deputy principals and rarely to other school leaders such as deputy principals, heads of departments, school committees and boards of governors (Otunga et al., 2008; Ayere, M.A.; Odera, F.Y. and Agak, J. 2010). Thus, lack of capacity can be traced to inadequate funding to KESI and lack of full time training facilities (Sessional Paper No. 1 2005: 65). The study will focus on implementation of projects as a core function of the secondary school boards of governors in Kenya. It casts doubts on quality management capabilities, training levels and effectiveness of secondary school boards of governors in providing leadership and good governance in implementation projects. In addition, the study casts doubts on the effectiveness of the boards of governors in contexts of political interference. Appointments of members of the boards of governors in Kenya as in other parts of the world such as in the United Kingdom is obvious with some purposely elected as channel for varied interests and hence such boards lack power and important interests by pass it as pointed out by Kogan (1984) (CCK,2009).

The secondary school boards of governors in Kenya have not been exposed to adequate management training. Also, majority of them lack adequate supervisory competencies to utilise available information for ICT management purposes. As such many secondary school principals lack the capacities to oversee and account for the utilisation of resources in projects under them. The inquiry of Koech report (Republic of Kenya, 1999) pointed out that management of educational institutions in Kenya was found to be weak because most the boards of governors lacked quality management capabilities. These challenges sometimes

lead to poor performance in national Kenya certificate of secondary education ((MoE, 2011b) and poor projects implementation that has led to poor ICT projects implementation. Poor examination performance leads to high wastage rate due to finances invested in education. Although all secondary schools in Kenya comply with government requirement of putting governing bodies, there is evidence of ineffectiveness due to bad governance perpetuated by authoritarian, draconic and undemocratic leadership. The appointment of secondary school governing bodies in Kenya is occasionally coupled with political interference which is contrary to the government policy pertaining consideration of persons who have qualities of commitment, competence and experience which would enhance the management and development of schools. However, this study was hoped to generate new knowledge that widen horizons of existing knowledge – concerning the boards of governors that could help them improve their managerial abilities that facilitate results based informed decisions in relation to governance and controlling ICT projects (MHEST and NCST 2010).

2.6.2 Teachers

Teachers perform a major role in ICT integration in schools since they are the closest people to both the students and the larger management. The teachers have an influence that not only touches on the students but also touches on the criteria of implementing the ICT projects. According to a research done by the MoE, (2011), most schools have the computer teachers as the major computer champions who instill and plan ICT activities at various schools. However, from the teachers' perspective, technology should be used for more than just support of traditional teaching methods (Tezci, 2011a). According to Tezci (2011a), teachers should learn not only how to use technology to enhance traditional teaching or increase productivity, but also should learn from a student centered perspective how ICT can be integrated into classroom activities in order to promote student learning. This means that teachers need to use ICT in more creative and productive ways in order to create more engaging and rewarding activities and more effective lessons (Birch and Irvine 2009; Honan 2008). Hence, Castro Sánchez and Alemán (2011) suggested that teachers keep an open mind

about ICT integration in classroom. It is imperative that teachers learn new teaching strategies to adapt to the new instruments when teaching with technology.

However, Muriuki Mureithi (2009) found that teachers use ICT more frequently for the preparation of handouts and tests than to promote critical thinking. Similarly, Palak and Walls (2009) found that teachers mainly use technology to support their existing teaching approaches and rarely to foster student-centered learning. According to the authors, one possible explanation is a lack of models for how to use technology to facilitate learning, and limitations related to contextual factors such as class size and student ability. Further, (ITU, 2010) found that pre-service teacher preparation does not provide sufficient ICT knowledge to support technology based instruction, nor does it successfully demonstrate appropriate methods for integrating technology within a curriculum. More training should be provided in pre-service teachers' curricula, and ICT skills must be applied in the classroom in order to integrate effective technology strategies (Williams, Mark D. J. 2010). To help teachers cope with these difficulties, Ayere (2010) suggested that rather than only providing education theories, ICT researchers should also document examples of how teachers accomplish meaningful and effective technology integration to meet their pedagogical goals and needs.

2.6.3 Students

Although the advantages of using ICT in the classroom have been demonstrated in previous research, barriers or challenges associated with its use still exist. Saekow, A. and Samson, D. (2011) showed that student mobility, special needs, and anxiety over standardized test results are the main challenges associated with ICT use. These challenges can be solved by providing more authentic group- and problem-based learning activities, and adequate learning support (Bingimlas, K. 2009). Farrell, G. (2010) also identified more barriers from the student perspective, including: subpar technical skills that reduce access to ICT in classroom; an insufficient number of academic advisors and lack of timely feedback from instructors; and reduced interaction with peers and instructors. Therefore, the author recommends the following strategies to facilitate the learning process: more induction, orientation, and training for students; an increased emphasis on the importance of instructor

access and effective administration; and the expansion of podcasting and online conferencing tools. In general, capacity building, curriculum development, infrastructure, policy, and government support are required in order to lower student barriers and improve the effectiveness of ICT use in the classroom. In addition, Castro Sánchez and Alemán (2011) encourage students to acquire specific technical skills to facilitate learning in ICT environments

2.6.4 The Government

The government recognizes that Kenya's main potential is in its people; their creativity, education, and entrepreneurial skills. The overarching goal of the vision 2030 is to turn the country into a globally competitive and a prosperous nation by the year 2030. The Education Sector has a major responsibility of facilitating the process of developing manpower necessary for transforming Kenya into a globally competitive country. To attain this, the sector is committed to the provision of quality education and training as well as research and innovation to the people of Kenya in line with the Constitution, National objectives and the globalization trends. To realize this, the sector requires clearly defined and supportive policies, institutional and legal frameworks that effectively address citizens' needs and aspirations as well as social economic dynamics. The Education Sector comprises three sub sectors which include: Ministry of Education (MOE) and its affiliated institutions, Ministry of Higher Education, Science and Technology (MoHEST) and its affiliated Institutions and Teachers Service Commission (TSC) (UNESCO, 2011).

Like many other countries in the world, Kenya has developed National ICT Policy (2006). It sets out the nation's aims, principles and strategies for the delivery of Information and Communications Technology to improve the livelihoods of Kenyans. Ministry of Education (MoE) introduced the National ICT Strategy for Education and Training (Farrell 2007). The ICT policy gives an opportunity for establishment grass root based infrastructure for knowledge sharing (Mureithi and Munyua, 2010). The ICTs in Education Options Paper (MOEST 2005), discusses the ways in which information and communications technologies (ICTs) can be leveraged to support and improve the delivery of quality education for all

Kenyan. It provides a comprehensive range of potential technologies to improve teaching, learning, and management. It is intended to enable the government of Kenya (GOK) to plan appropriate ICTs in education interventions as they move forward with the comprehensive Kenya Education Sector Support Programme (KESSP). This includes interactive radio instructions (IRI), use of computers in schools, development of ICT skills and the access of internet. There is rich literature on ICT initiatives in Kenya both by GOK and nongovernmental organizations (NGOs). GOK and the U.S. Agency for International Development (USAID) have a joint commitment to improve education in Kenya in collaboration with Kenya's Ministry of Education (GOK, 2010). This is aimed at Accelerating 21st Century Education (ACE) by improving the quality of primary and secondary education through the effective use of information and communications technology (ICT). The initiative to establish a School Technology Innovation Center (STIC) in Nairobi will serve as a hub where education leaders and teachers access the latest information on technology solutions that are proven to enhance innovative teaching and learning, thus improving the skills needed by students to thrive in the 21st century (MoE, 2011b).

Kenya has government ICT Board whose main objective is to avail quality and affordable technical support to the Digital Villages to enable their smooth operation. The board has technical support focus points of standardized method for the testing and implementation of new software, the upgrading of hardware and the overall tracking of licenses and equipment. It also develops a collaborative relationship with the person responsible for Technical support and encourage them to include capacity building in the planning of future changes. The board works closely with the education institutions to ensure quality technical services as well as the internet providers (World Bank, 2010). From research, the attempt to integrate ICT in Kenyan secondary schools is faced by various challenges such as Lack of adequate number of computers in the schools, inability to acquire sufficient computers or update those which are obsolete is due to lack of finances, fast changing technology and high overhead costs, loaded curriculum which make it difficult to find time to prepare ICT teaching materials,

Lack of a unified school curriculum in primary and secondary schools, resistance by teachers to use ICT in teaching and learning, the lack of government employed teachers. The limited number of teachers employed by government to teach ICT related knowledge leaves more schools with no option rather than leaving the schools forced to hire thus draining the scarce resources which could have been used for upgrading the ICT facilities. This is backed by the government report on ICT capabilities in secondary schools in Kenya (Kidombo 2009)

However, a report by MoE (2013) on the Establishment Computer Supply Programme 2013-2015, in order to achieve Vision 2030 goal of “establishing a computer supply program that will equip students with modern ICT skills”, the Ministry continued pursuing a programme targeting 20,229 public primary schools, 4,000 public secondary schools, 20 PTTCs, 2 diploma and 10 Model e-learning centres for ACE. During the period under review the Ministry enhanced the supply of ICT to schools by facilitating the equipment of two schools in every constituency with fully functional computer labs. This complimented the initiative started under the ESP in FY 2010/11. Each benefiting school was funded to procure and set up a lab with 11 computers, networking, a printer, an overhead projector and other related accessories. The Multimedia Media Project (Televic) to equip selected secondary schools with content delivery systems implemented the project in 240 schools. The project will be fully actualized with capacity development and M&E to ensure ownership and utilization during FY2012/13 (MoE, 2013).

2.6.5 Non-Governmental Organisations

The research will consider one major NGO that has done a series of studies on Kenyan ICT school situation and made a number of relevant recommendations. The Global e-Schools and Communities Initiative (GeSCI) is a global organization offering strategic advice to Ministries of Education in developing countries on the effective use of ICTs for Education (Kozma R.B.2009). It is not a funding or implementing agency; rather it is a technical assistance and capacity building organization. Its work focuses on : assisting countries develop comprehensive frameworks, policies and strategies; assisting the government

convene, align and coordinate stakeholders; providing technical and strategic advice in the deployment and integration of ICTs in Education ,and, building the capacity of the relevant government agencies and other stakeholders to enable them effectively acquire, deploy and manage ICTs for Education (Kidombo , H.J. 2009).

In GeSCI's new strategic phase (2009-2011) it intends to engage with more countries and Kenya, among other countries, has been identified as a possible country to engage with. Before GeSCI can engage with any country, it carries out a detailed situational analysis and based on this develops an engagement strategy in consultation with the country. The situational analysis is meant to develop a general understanding of the main education issues, determine the country's interest in using ICTs for Education, determine progress made in deploying and using ICTs in the Education sector, identify key challenges in using ICTs in the Education sector and determine if there is a role for GeSCI to play (Kadzo, L. 2011).The situational analysis for Kenya was carried out between April and mid-September 2009 using three broad processes: a desk study of relevant government documents; a country visit, which took place from 14-17 April 2009, during which interviews, meetings and focus group discussions were held with key stakeholders (Ministries responsible for education and training and their agencies, other government agencies in charge of ICTs, educational institutions and Development Partners) involved in ICT in education initiatives, and a Round Table meeting of stakeholders met on 24 April 2009 during which the preliminary findings of the country visit were presented and validated. Historically Kenya has always prioritized education and training at all levels as it is considered the foundation for social and economic development. The goal of education and training is to build the human resources necessary for national development and wealth creation (GOK, 2012).

However, the government is faced with many challenges in realizing this goal; challenges which may be broadly categorized under the banners of access, quality, equity and relevance. Despite having made tremendous progress in providing access to education to more Kenyans through free primary (started in 2003) and secondary education (started in 2008), access continues to remain a challenge with still almost 1 million children not enrolled in formal

schools, with less than 50% of eligible children attending secondary school, and with a university Gross Enrolment Ratio (GER) of 3% which is less than the African average (GOK, 2009). Maintaining and improving quality in a rapidly expanding sector pose considerable challenges. Most institutions are not equipped to handle the substantial increase in enrolments in terms of physical space, teachers (shortages and inadequate preparation) and instructional materials and equipment. Other factors cited as impinging on quality are overloaded curricula, poor resource management in institutions and inadequate quality assurance mechanisms. Inequities and regional disparities remain despite the huge increase in enrolments. Overstretched facilities and high student: teacher ratios result in “inequity in quality”, especially in urban slums, rural and Arid and Semi-Arid Land (ASAL) areas. For education to be relevant it must fulfill societal expectations in preparing citizens with the required knowledge, skills, attitudes and values appropriate for a modernized and globalized world. Outdated and inappropriate methodologies and the mismatch between what is taught at institutions and what the economy and society demand, are cited as the main factors hampering relevance (MoE, 2011a).

The 3 central government Ministries responsible for the education and training sector i.e. Ministry of Education (MoE), Ministry of Higher Education, Science and Technology (MHEST) and Ministry of Youth Affairs and Sports (MOYAS) each with their own distinct mandates and roles and responsibilities, have devoted considerable effort to addressing the major challenges facing the sector (Amega S. et al. 2009). Nevertheless, the education and training sector requires more support, fresh approaches and creative solutions to effectively deal with the complex challenges. The government is well aware of the potential of Information and Communication Technologies (ICTs) to help address some of these challenges and of ICTs broader roles in human development and in the development of a knowledge-based economy (GOK, 2012). This is clear from official statements and documents such as the national plans (Kenya Vision 2030, Poverty Reduction Strategy, and National ICT4D Policy) and education sector plans and policies (KESSP, Sessional Paper No. 1 of 2005, National ICT Strategy for Education and Training) which all emphasize the role of ICT

in education and national development. The situational analysis confirms that there is evident interest and concerted effort on the part of the government, the Ministries responsible for education and training, and development partners to use ICTs to tackle the complex challenges faced by the sector (World Bank, 2010).

As a result the education sector receives considerable support from development partners and civil society for some of their ICT initiatives. All ministries have budget line items which facilitate ICTs across the departments (UNESCO, 2013). There are several ICT initiatives by government ministries, development partners and other stakeholders underway and the MoE is supported by several groups in the implementation of these initiatives, e.g. the ICT Global Development Alliance, the ICT Integration Team, the ICT Trust Fund and a number of private partners such as Microsoft, Intel and Cisco as well as NGOs such as NICE and CFSK (The World Factbook, 2010).

2.7 Conceptual Framework

The conceptual framework outlines the dependent, independent and intervening variables as discussed in the literature review and elaborated in the Figure 1 below. It helps one to understand the relationship between the variables of the study.

Independent Variables

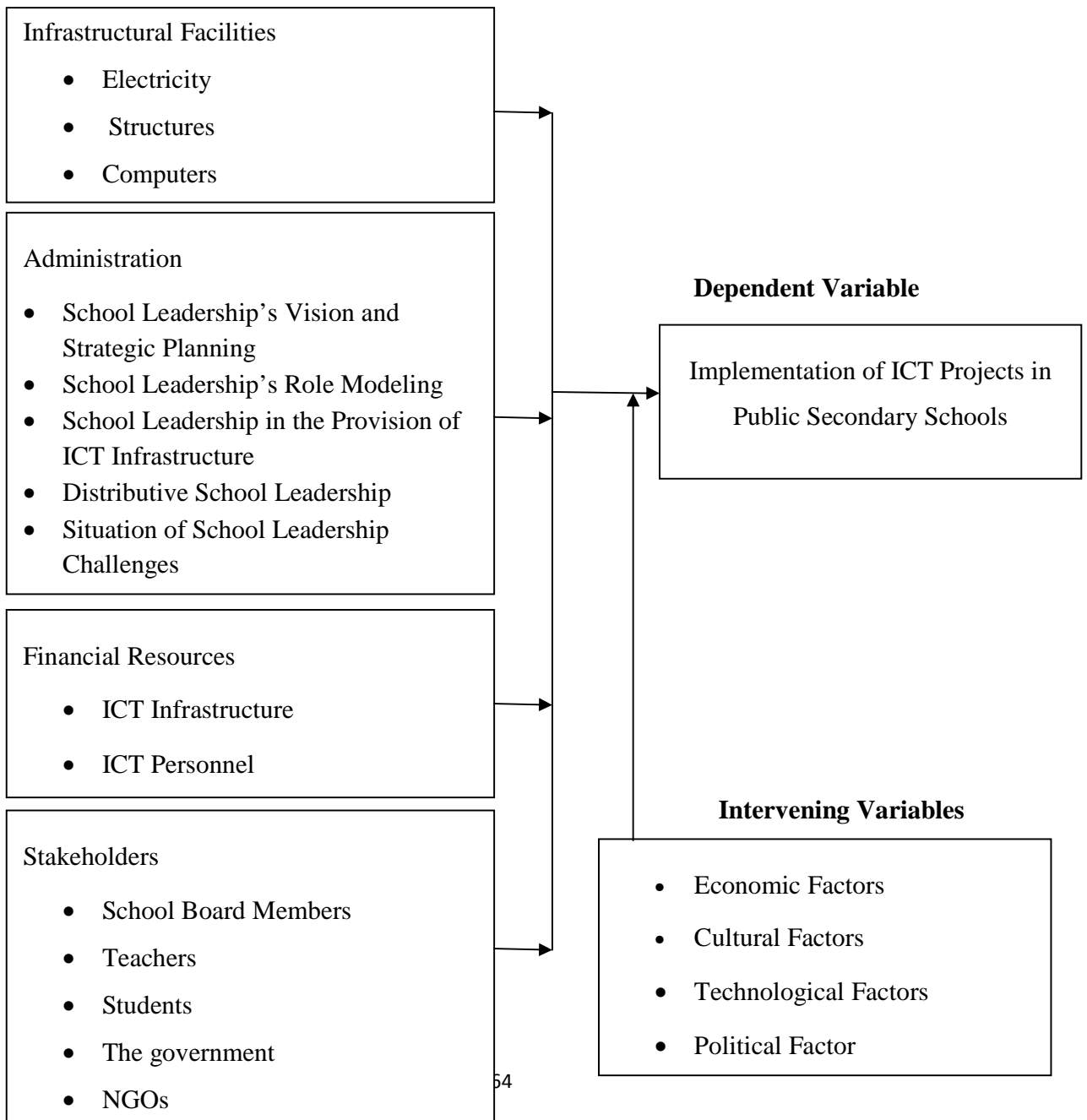


Figure 1: Conceptual Framework

In the above conceptual framework, the study was focused on the interaction between the variables that influence the implementation of ICT projects in secondary schools in Kwale County. The independent variables are the variables the researcher cannot manipulate or change which include the ICT facilities and infrastructure, School administration, Stakeholders and Financial resources. ICT projects implementation is the dependent variable on the other hand, while Cultural factors, Technological factors and Economic factors act as intervening variables as illustrated in the figure of conceptual framework. The ICT infrastructures in schools include structures like computer laboratories, electrification and computers themselves. The kinds of infrastructure available in schools depend on the availability of financial resources which mainly determine the kind of infrastructural facilities to be given priority. For effective implementation of ICT projects, there has to be adequate and timely stakeholders' support like the Government, NGOs, political leaders, teachers and even the students who should embrace and solve issues related to ICT projects implementation in schools.

The school administration should formulate ICT policies and plans as well as set ICT budget. These would influence innovations purchase in the schools in terms of quality and quantity. The administration should organize for staff development especially in-service training for teachers. The teaching load and the time schedule determine if the teacher have time to prepare ICT learning materials. Administration plays a major role of providing financial, moral and leadership support that creates a favourable climate for ICT. The administration should give democratic leadership that warmly welcomes ICT in the learning environment and should not be seen as a threat. The result of all these relationships is effective implementation of newly adopted ICT projects in education resulting into successful ICT projects implementation in Kenyan secondary schools.

2.8 Summary of Literature Review

Literature has revealed that the developed countries have made remarkable investment ICT as well as integrating ICTs in their education system characterized by well formulated ICT national policies and specific strategies of ICT in education. On the other hand the developing countries Kenya included are rapidly and heavily investing in ICTs despite the other challenges they face for instance drought and famine (WHO, 2012). Despite these efforts, the countries still have low internet connectivity, inadequate power supply especially in the rural areas where most schools are located coupled with regular interruptions, low number of computers in schools, limited /no computer laboratories. This creates a digital divide between the developed and the developing countries and thus the developing countries miss out on the benefits of ICT in almost all aspects including education which is the cornerstone of the economy and an avenue to break the poverty cycles on the developing countries (UNESCO, 2010).The study was done to assess the factors that affect the effective implementation of ICT projects in public secondary schools specifically in Kwale County.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction.

This chapter discusses the methodology that was used to conduct the study, focusing on research design, study location, target population, sampling procedures and sample size, research instruments, questionnaires, pilot study, reliability, validity, data collection procedure and methods of data analysis.

3.2. Research Design.

Research design refers to the procedures selected by a researcher for studying a particular set of questions or hypothesis; this includes the researcher's choice of quantitative or qualitative methodology, and how, if at all, causal relationships between variables or phenomena are to be explored (Orodho, 2009). Non-experimental descriptive survey design was used to establish the factors that are influencing the implementation of ICT projects in secondary schools in Kwale County. A survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The study aimed at collecting opinions from the teachers, students who are major recipients and the principals about factors influencing successful implementation of ICT projects in secondary schools. The secondary data was collected from literature review from the internet, journals and relevant books while questionnaires, observation and interview schedules enabled the researcher collect the primary data.

3.3. Locale of the Study

The study was carried out in Kwale County, (formally Kwale District in coast province Kenya). Kwale County is approximately 60 kilometers from Mombasa. It is a fairly economically productive area with coconut as the major cash crop. The investment in education includes both the private and public primary schools that feed the fairly well distributed secondary schools. There is fair infrastructure development such as good roads,

communication which includes a local radio station, electrification etc. These made the setting easily accessible and permitted instant rapport with the respondents. No similar study has been carried out in the setting.

3.4. Target Population

Target population is a set of people or objects the researcher wants to generalize the results of the research (Borg and Gall, 1989). In Kwale County there are about 60 secondary schools with 18,200 students. Two are National schools- one girls another boys school, 10 county boarding schools-six girls schools and four boys schools, 18 district boarding and day while 30 are district day schools. There are 650 teachers in Kwale County. All this population made the population of study

Table 3.1 The Number of Respondent Sample in Five Schools.

School Category	Total Number	Sample Size	Percentage
National Schools	1,920	30	10.41%
County Boarding	8,180	86	29.86%
District Boarding	5,180	58	20.14%
District Mixed Boarding	1,685	57	19.79%
Mixed Boarding/Day	1,685	57	19.79%
Total	7,240	288	100%

Source: Kwale County School Statistical Return 2013.

3.5. Sample Design and Sampling Procedure

Sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population, the statement about the sample should be true in

relation to the population (Orodho, 2009). According to Mugenda and Mugenda (1999), for descriptive study 10% of accessible population is enough. Given that the target population is heterogeneous due to the nature of the schools in the region, stratified random sampling was used to allow full participation of the schools. Twenty schools were expected to make up the sample size representing 30.32% of the total population. There are two national schools one boys school the other girls' school. Six County/provincial schools: three boys' and three girls' schools were included in the sample. In the district boarding category, four schools were sampled to represent each gender. The rest was sampled from the mixed boarding /day and day schools as outlined in the sample grid. Four teachers were randomly picked to be the respondents in each sample school, ten students were randomly picked to represent the schools randomly selected and eight principals were interviewed to represent each category of schools. This made 288 respondents who were considered for the study.

3.6. Research Instruments

These are tools that are used by the researcher to collect data from the sampled respondents in a study (Kombo and Tromp, 2006). The questionnaires were used to collect data from the teachers and students while the principals were interviewed. Observation helped to gather crucial information that could not be obtained through interviews and questionnaires. The questionnaires were used to collect bio-data of the teachers, background information of the schools and gather information on the ICT projects status in the schools. Interview guide was used to gather information from the principals to establish the ICT policies, resources allocation and their influence in ICT projects in their schools.

3.7. Piloting

This is exposing the instruments to a small number of respondents to test the validity and reliability. The instruments were piloted in two schools and the procedure repeated in two weeks. Piloting helped the researcher to eliminate any ambiguity in the research instruments to ensure they generate valid results of the research. The schools where piloting took place were part of the study sample to avoid bias results of the study.

3.7.1. Validity of the Instrument

Validity is a measure of how well a test measures what it is supposed to measure (Kombo 2006, Orodho 2009, Mugenda 1999). Validity is the degree to which results obtained actually represent the phenomenon under investigation. Validity was established through close consultation and expert judgment of the supervisors; they verified the validity of the research instruments used in the study.

3.7.2. Reliability of the Instrument

Reliability is the measure of the degree to which a research instrument yields consistent results after a repeated trial (Mugenda and Mugenda, 1999; Orodho, 2009). An instrument that yields consistent results over time is said to be reliable (Wiersma, 1985). Test-retest method was used to test the reliability and validity of the instruments. Test-retest technique involved administering the same instrument twice to the same group within two weeks.

Reliability correlation coefficient (r) will be calculated using the Spearman rank order.

$Rho(r) =$

Where: r = Spearman's coefficient of correlation.

d = difference between ranks of pairs of the two variables

n = the number of pairs of observation

When a correlation (r) of 0.80 was obtained which is higher than 0.75 as recommended by researchers (Orodho 2009), this was considered high enough to judge the instrument as reliable.

3.8. Data Collection Procedure

The researcher got permit from the graduate school and the relevant authorities to undertake research. The CDE- Kwale County was contacted and was informed that the study was taking place in the region. The researcher visited the sampled schools and administered the questionnaires and conducted the interviews. Appointments to the sampled schools were arranged prior to the visits to avoid any inconveniences to the respondents. The researcher emphasized that the information given was specifically for the study and it was private and confidential and that names were not necessary.

3.9. Data Analysis and Presentation

Quantitative data collected was then entered into the computer, and analyzed using descriptive analysis mainly; Statistical Package for Social Scientists -SPSS (Orodho, 2009). Qualitative data was analyzed using content analysis method and opinion of majority was summarized. The data collected was summarized and the results recorded in form of cumulative tables. Data collected was consequently analyzed, using appropriate techniques, to reveal the required patterns, as well as the factors affecting implementation and incorporation of Information Communication Technology in secondary schools. The report produced was both descriptive and analytic, reflecting the linkages among the factors, and identifying the gaps in the existing policy framework. It offered a clear set of actionable recommendations for the different players in education. The draft report was submitted for review and discussion by the ministry of education and key partners in education, and comments emanating from the review and discussion were incorporated into the final report.

3.10 Logistical and Ethical Issues

In response and cognizant to the Social Research Association (2003) ethical guidelines enable researchers to make individual ethical judgments and decisions that comply with principles of research. The basic ethical principles are autonomy, beneficence, justice, informed consent, privacy, confidentiality and respect for persons. While research may well be intentioned, there is always a possibility that an interaction with the respondents may inadvertently cause psychological, financial or social harm. Singer (2008) notes that, in survey research, the breach of confidentiality and loss of privacy and the effect of such breaches are the most serious risk of harm to respondents. Such a breach may cause loss of employment, reputation, or civil or criminal suits. In this study, all participants were granted their consent during the sampling stage whereupon limited personal information was requested by the researcher to guide the administration of questionnaires. The researcher ensured that the information provided is safeguarded and not revealed to any third party unless with the informed consent of the member and the participating in the research.

The researcher observed ethics in data collection. Permission was sought from the local administration as well as from the respondents with explanations on how the research contributed towards enhancing proper project management methods. Privacy, confidentiality and dignity of the respondents were considered during the research. Names of the respondents were not being exposed and codes were used instead. The respondents were assured that a feedback session was also to be organized in order to disseminate the research findings to the schools and educational stakeholders

3.11 Operational Definition of Variables

Table 3.2 Operationalization Table

Objective	Variable	Indicators	Measurement scale	Types of analysis
To establish how infrastructural facilities influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.	Infrastructure	Electricity Structures Computers	Nominal Scale	Descriptive
To establish how school administrative practices influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.	Administrative Practices	Vision and Strategic Planning Role Modeling Provision of Infrastructure Distributive Leadership Situation of School Leadership Challenges	Nominal Scale	Descriptive
To determine how financial resource influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.	Finances	ICT infrastructure ICT personnel	Nominal Scale	Descriptive

To examine the influence of stakeholders in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya	Stakeholders	School Board Members Teachers Students Government NGOs	Nominal Scale	Descriptive
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CHAPTER FOUR

DATA PRESENTATION AND INTERPRETATION

4.1 Introduction

The data collected was keyed and analyzed by simple descriptive analysis using Statistical Package for Social Scientists (SPSS) version 20.0 software. The data was then presented through tables, charts and narrative analysis. The chapter presents data in different sub-sections that is; general information on category of gender, position, experience and level of education of the respondents, the effects of infrastructural facilities, finances and financial resources influence, leadership styles and stakeholders' influence .

4.2 Response Rate

Questionnaires were administered to 20 selected schools by 10 enumerators in the larger Kwale County. Out of the 280 questionnaires issued, 260 were returned, fully filled. One on one interview was done with the 8 principals. Total response rate for the questionnaires was 93% while that of the interview guide was 100%.

4.4 Demographic Characteristics and Basic Information of the Respondents

The study wanted to find out the bio data of respondents, age and educational level as shown in the tables below.

4.4.1 Bio-data of the Respondents

The study found out the sex composition of the respondents as shown in the table 4.1 below.

Table 4.1 Sex Distribution of Respondents

Sex	Frequency	Percentage
Female	91	35.00%
Male	169	65%
Transgender students/teachers	00	00.00%
Total	260	100%

From the table above, male gender dominates from classroom level, teacher level to the headship level. Male respondents made majority of the respondents at 65% while the female

respondents who participated in the study made 35%. Transgender respondents were not in the population sample/did not disclose their gender.

4.4.2 Age Distribution of Respondents

The study sought to find out the age brackets of the respondents in the study and the results were as shown in table 4.2 below.

Table 4.2 Age Distribution of Respondents

Age	Frequency	Percentage
10-20	113	43.46%
20-30	90	34.61%
30-40	36	13.85%
40-50	14	5.39%
Above 50	7	2.69%
Total	260	100%

The table shows that majority of the population that participated in the study was between ages 10 -30 years with ages 10-20 making 43.46% and 20-30 making 34.61%. These were ages occupied by purely students and young graduates who had joined the profession. The group was very vital for the study because it had a vast knowledge of ICT and most of the teachers had laptops/computer desktops. Ages 30-40 made 13.85%, 40-50 made 5.39% while over 50 years which was purely headship level made only 2.69%. Indeed this was a good indication that the sample selected had good knowledge about ICT projects in schools.

4.4.3 Educational Level of Respondents

The study sought to establish the level of education of the respondents since students, teachers and administrators were part of the population.

Table 4.3 Academic Qualification of Respondents

Education level	Frequency	Percentage
Form 1&2	90	34.61%
Form 3 & 4	90	34.61%
Diploma	06	2.32%
Degree	53	20.38%
Degree with PGD	04	1.54%
Masters	04	1.54%
Others	13	5.0%
Total	260	100%

The study had Form one and two who made 34.61% of the respondents while form 3 & 4 four made 34.61 percent. This means that the research grouped the students into upper and lower classes. Teachers with diploma made 2.32%, with Degree made 20.38%, with Degree plus PGD made 1.54%, with Masters made 1.54% while 5.0% was composed of teachers with other qualifications like certificate from vocational training colleges.

4.4 Infrastructural Facilities' Influence on ICT Projects Implementation in Schools

Use of ICT in education is directly dependent on the availability of necessary infrastructural facilities which include number of computers, computer rooms/laboratories, and electricity grid and internet connectivity.

4.4.1 Schools with Computer Projects

Data was gathered and analyzed from both the key informants and respondents on the question of whether their schools had computers or not and the response was as shown in the table 4.4 below.

Table 4.4 Schools with Computers

Computers	Frequency	Percentage
YES	160	61.5%
NO	100	38.5%
Total	260	100%

The table above shows that 61.5 % of the schools sampled have computers in their schools while 38.5% have almost none .This was in a way tied to the fact that ICT4ED program has propelled the evolution and integration of ICT in most secondary schools recently.

4.4.2 Number of Computers in Schools

Still of ICT infrastructural facilities, the informants and respondents were asked a question of the number of computers in their schools in order to ascertain whether most schools in Kwale County had computers corresponding to the national requirement of at least 20 computers.

Table.4.5 Number of computers in School

Number of Computers	Frequency	Percentage
0-5	90	34.61%
5-10	80	30.77%
10-15	60	23.08%
15-20	20	7.69%
Above 20	10	3.85%
Total	260	100%

34.61% of the respondents said that their schools have almost none/less than 5 computers, 30.77% have between 5 to 10 computers, 23.08% have between 10-15 computers, 7.69%

have between 15-20 while those having the normal recommended number of computers by ICT4ED (2010) of above 20 were at 3.85%.

This was a sign that most of the schools lacked the computers that greatly facilitated the ICT integration and implementation projects in their schools. Only 3.85% of the respondents said that their schools had above the recommended number of 20 computers in their schools while the rest were not reaching the standard limit set; a clear indication that computer scarcity have greatly limited the implementation of ICT projects in Kwale County.

4.4.3 Internet Connection in Schools for Computers

The study sought to find out the state of internet connectivity in most of the schools. This was to establish how much the schools have integrated the modern ICT projects that included accessing learning and teaching materials from the internet and the respondents gave their views as shown in the table below.

Table 4.6 Internet Connection in School

Internet Connectivity	Frequency	Percentage
Prepaid modem	169	65%
Internet server	13	5%
Not connected	78	30%
Total	260	100%

According to the findings of the study, only 5% ratings of schools have a full connected internet.65 % are able to access internet through the local modems especially that from Yu, Zain and Orange providers since Safaricom was said to be expensive.30% of the schools did not have internet connection. This implies that most of the students and teachers never access the e-learning materials. According to the respondents, this was a challenge that put most of

the schools far away from achieving the reality of ICT integration in most secondary schools in the County.

4.4.4 Location of Computers in the Schools

The location of the computers in the school determines if they are accessible for use in the teaching and learning and whether the school has fully implemented ICT projects as set by ICT4ED and computer for schools program. The respondents were asked the question in order to ascertain the schools with well-equipped computer laboratories and the results shown in the table below were found.

Table 4.7 Location of Computers in the Schools

Location	Frequency	Percentage
Computer laboratory	60	23.08%
Offices	80	30.77%
Converted classes	90	34.62%
Staff room	20	7.69%
Other places	10	3.85%
Total	260	100%

The study found out that most of the computers in the school are found in the converted classrooms and was represented by 34.62%, 30.77% have their computers in the offices while 23.08% have their computers placed in fully equipped computer laboratories. Only 7.69% have a computer in the staffroom while 3.85% have their computers in other places.

This implied that the planned ICT projects for secondary schools have not been fully implemented in Kwale County. The observation schedule revealed that most of the day schools have less than five computers most of which are used for clerical work in the school. Most of the schools did not have computers in the staffroom. This limits the teachers' use of computers in preparation for their class presentation. In addition only six schools had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies.

A question that sought to know why the number of computers were as shown above found out that most of the schools had many students and teachers due to the free secondary education with squeezed structures/buildings, forcing the administration favour classes building and offices to computer laboratories that were viewed as not very urgent and very important. This has always had an overall negative impact in implementing ICT projects in schools in the region since most of the computers were not accessed from the best points for better learning and integration.

4.4.5 Power Supply Infrastructure

The respondents were asked to identify the major source of power in their schools and the response given was shown in the table below.

Table 4.8 Source of Power Supply

Power Type in Schools	Frequency	Percentage
Electricity	130	50%
Electricity & Generators	52	20%
Generators	26	10%
Solar	26	10%
No power supply	26	10%
Total	260	100%

The research found out that 50% of the schools have electricity and electrical power connections, 20% have both backup generators & electricity, and 10% have generators as their power source, 10% use solar power while the remaining 10% have no source of power at all.

However, when asked to give reasons for their response in the question that related to the source of power, the study found out that there were frequent power black outs that could last up to about four days. This had a very great negative effect to the point of some schools not able to use the computers in their schools at all since they had no immediate predictable electrical power to enable their operations.

Other schools went for generators as power source/back up; making the whole exercise of ICT projects integration in learning very expensive. Also, some schools had no power sources completely despite the fact that they had some computers donated to them. The computers were found to have been left catching dust in stores.

Teachers and students were asked to indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows.(SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree).

Table 4.9 Teachers and Students' Views on infrastructural facilities and ICT projects

Factor	SD	D	U	A	SA
There is adequate Number of Computers in Schools for ICT implementation	75	77	40	36	32
The schools have Internet Connection for Computers	60	78	40	46	36
The school has well-equipped computer laboratories	88	67	37	35	33

4.5 Administrative Practices that Influence ICT Projects

The research sought to establish the views and responses from the respondents on the role that administration plays in promoting the implementation of ICT projects in their schools. The study administered questionnaires and a one on one interview was done with the 8 school principals.

4.5.1 Teachers and Students' Views about Administration on ICT projects

The respondents and informants were asked to give their view on whether school administration supported the implementation of ICT projects in their schools and results in the table below given.

Table 4.10 Teachers' and Students' Views

Answer	Frequency	Percentage
No	169	65%
Not Sure	13	5%
Yes	78	30%
Total	260	100%

The respondents had the view that most administrators in secondary schools in Kwale County don't support the implementation of ICT projects fully. This was with 65% of the respondents while 5% were not sure and 30% agreed that school administration supports ICT. When asked to give reasons for the above answers, a great percentage argued that the school principals were very mean and they couldn't buy even the basic anti-virus for the computers while other principals were said to be dictators who didn't see the importance of the computers in schools or the importance of listening to other staff members' advice about the importance of implementing ICT projects in schools. Other principals were said to be

fearful of the change they viewed that could be accompanying ITC in their schools especial due to the belief that computers will spoil the students.

4.5.2 Administrators' Roles in ICT Projects Implementation

Teachers and students indicated their positions on the factors below and how they influences ICT implementation. 1 = strongly disagree 2= disagree 3= weakly agree 4= agree 5= strongly agree

Table 4.11 Teachers' and Students' Response

Factor	1	2	3	4	5
The school administration use ICT in administrative purposes	50	46	47	65	52
The school administration embraces students' involvement in ICT	52	53	39	62	54
The school is on a website	87	67	38	36	32
The school has an e-mail address	47	47	52	57	57
Majority of the offices are equipped with ICT equipment	86	56	42	39	37

The research found out that 19.5 % of the respondents strongly disagreed with the view that their school administrators use ICT in their administration practices, 17.5 % disagreed while 18% weakly agreed since they were never sure. On the other hand, 25% agreed while 20% strongly agreed; showing how fast ICT is taking its roots in schools. 20% strongly disagreed on the factor that most schools embrace students' use of ICT, 21% disagreed, 15% weakly agreed while 24% and 20% agreed and strongly agreed respectively.55% of the respondents strongly argued that their schools are not on the website, 35% disagreed,6% weakly agreed,4 % agreed while there were no respondents strongly agreeing with the statement.15%, strongly disagreed on the factor that their school has an e-mail address, 15% disagreed, 20% weakly agreed,25% agreed while 25% strongly agreed. On the issue of most offices being equipped with ICT equipment, 54% strongly disagreed, 24%disagreed, 10% weakly agreed, 7% agreed while 5% strongly agreed. The above implies that a greater percentage of the

management is adopting the use of ICT in their schools, although still a lot has to be done especially in the day to day use of modern ICTs in the school programs management.

4.5.3 Practices by the Administrators that Influence the Implementation of ICT in Schools

From the observations done by the researcher and the information gotten from the one on one interview with the 8 principals, it was observed that the computers in the schools are mainly located and used in the office for office practices. Out of the eight principals interviewed, it was only three of the 8 who had a school policy on the use, and, integration of ICTs in school contained in their schools' strategic plans of five years and ten years respectively. The others did not have a clear cut strategy on how to integrate use of ICTs in teaching and learning in their school. The interviews conducted to the principals had the following outcome. Four of the principals had 6-10 years of experience as principals in different institutions. The other three had experience of between 10-20 years while one of them was newly posted to the institution. They all had one thing in common that there was lack of technological culture in teaching and learning in their schools.

Two principals in the day and mixed boarding/day schools and other two from district boarding category revealed that in their schools there was no clear ICT budget and the costs of ICTs are integrated in other vote heads like tuition and boarding. This represented 50% of the total number of heads interviewed. They further argued that finances greatly constrained their plans to integrate ICT projects in their schools. Two of the other principal in the County boarding school revealed that their ICT budget is purely financed by the parents which include human resource. This represented 25% of the interviewed population. The principals of the Nationals schools were reluctant to respond on budgetary issues. Only 3 principals of the 8 principals interviewed had benefitted from the government economic stimulus programme of providing ICTs in secondary schools and the Computer for Schools Initiative. This indicated that stakeholders like NGOs, politicians and even CBOs are performing almost nothing in providing ICT projects enablers in schools like computers, electricity,

projectors and much more. The principals also noted out that they did not have specialized ICT teachers in their schools and employing teachers was an additional strain to already an over stretched budget. This was very common in the day schools which did not ask for extra money from the parents apart from the fees as guided by the ministry of education. On the issue of internet connectivity and placing their schools on the website, 5 principals felt that putting their schools on the website could lead to unnecessary expenses while investing in the internet could allow most students access the prohibited websites and get eroded culturally.

4.6 Financial Resources

Teachers and students were asked indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows. (**SA- Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree**).

Table 4.12 Financial Resources Role

Factor	SA	A	U	D	SD
There is adequate financial resources allocated for ICT implementation	32	36	40	77	75
The school spends a reasonable amount of money on ICT implementation	36	46	40	78	60
The school is capable economically to implement ICT projects	33	35	37	67	88

From the table, the researcher found out that 41.7% of the respondents strongly disagreed with the view that there is adequate financial resources for ICT projects in their schools, 45.8% disagreed, 8.3% were uncertain, 4.2% agreed and there were no responded who agreed with the statement. The statement on schools spending a reasonable amount of money on ICT implementation was supported by 4.2% who strongly agreed, 10.4% disagreed, 8.3% were uncertain while majority at 45.8% disagreed and 31.3 strongly disagreed. Most schools were

found to be capable economically to implement ICT projects where;50.0% of respondents strongly disagreed,31.3% disagreed,14.2 % were uncertain,2.1 agreed while those strongly agreeing being at 2.1%.

Lack of enough financial resources was therefore found to be a central challenge that faced most the management and other well-wishers in schools' ICT projects implementation. This was as a result of strained and constrained school budgets during these high inflation times.

4.7 Role of Stakeholders in ICT Projects Implementation

The study sought to find out how the school stakeholders contributed or hindered the implementation of ICT projects in public secondary schools and the results were as discussed in the tables bellow.

4.7.1 The Major Source of Funding for ICT Projects in Schools

The respondents were asked to indicate the source of most donations/funds/ICT related equipment in their schools and gave the following information shown in the table below.

Table 4.13 Funding Stakeholders

Donor/Funder	Frequency	Percentage
Government	90	34.61%
NGOs	80	30.77%
BOG	60	23.08%
Teachers	20	7.69%
Others	10	3.85%
Total	260	100%

The study found out that the sources of computers and finances aimed at implementing ICT projects majorly come from the government and the NGOs. The government sources were favoured by 34.61% of the respondents, 30.77% of the respondents went for the NGOs, 23.08% for the BOG, 7.69% for Teachers while other sources were said to be rated at 3.85%.

This however could be attached to the fact that the government has been greatly advocating for the introduction, integration and use of modern ICT in all of its offices and private sector for improved production. This has seen the government give several computers to schools through the computer for schools program, ICT4ED and ICT4D projects all around the county and also at County levels like Kwale County. NGOs have also done a great in promoting ICT spread in the government offices and schools. Plan international for example has been crisscrossing Kwale County and donating computers and giving free computer lessons to secondary and primary schools.

4.7.2 How often the Teachers and Students Access the Computers for Lessons

Teachers should be in position to access the computers so that they can use them in teaching and learning in class: The students too so as to use them in learning. The table below show how often teachers and students access the computer.

Table 4.14 How often Teachers and Students Access the Computers

Computers Access Rate	Frequency	Percentage
No response	10	3.57%
Daily	92	35.71%
Weekly	74	28.57%
Monthly	56	21.78%
Once a term	09	3.21%
Never	19	7.14%
Total	260	100%

Only 35.71% of the teachers and students are able to access the computers daily, 28.57% access them weekly and 21.75% access them monthly while 3.21% of the teachers access them once a term. 7.14 % did not access computers at all while 3.57 % did not reveal how often they access computers in the school. This implies that majority of the teachers and students are not able to access computers more often. Those who access the computers have varied use ranging from personal use to official use. The main use of computer among the teachers is to access the CD ROMs and prepare assignments and test which is mainly done in the office while most of the students indicated that they used the computers to play games and at times to listen to music whenever the concerned teacher was never a round.

However, limited access to school computers by the teachers who constitute the major component of the stakeholders of ICT projects implementation in secondary schools was a

clear indication that the major stakeholders in ICT for schools projects were not supporting the programme positively. Some teachers and students couldn't bother going to the computer rooms because they felt that it was a waste of their precious time that they could use for their studies.

Teachers and students were asked indicate the extent to which they agreed with the following reasons that influence the adoption of ICT in school and the results were as follows. (**SA- Strongly agree, A- Agree, U- Uncertain, D-Disagree, SD- strongly disagree**).

Table 4.15 Teachers and Students' Views on role of Stakeholders in ICT Projects Implementation

Factor	SD	D	U	A	SA
Sources of computers and finances aimed at implementing ICT projects majorly come from the government and the NGOs	32	40	75	77	36
Teachers and Students often access the Computers for Lessons	36	46	40	78	60

4.8 Testing of Hypotheses Using Chi-Square

4.8.1 Testing of the First Hypothesis

H₁; Infrastructural facilities have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya

Table 4.16 Showing Observed and Expected Responses on Role of Infrastructural Facilities.

Scale	SD	D	U	A	SA
Observed (O)	75	77	40	36	32
Expected (E)	52	52	52	52	52

Table 4.17 Showing Chi-Square Testing for the First Hypothesis

O	E	(O-E)	(O-E) ²	(O-E) ² /E
75	52	23	529	10.17
77	52	25	625	12.02
40	52	-12	144	2.77
36	52	-16	256	4.92
32	52	-20	400	7.69
				$\sum (O-E)^2/E = 37.57$

$\chi^2_C = 37.57 > \chi^2_{\alpha, 0.05} : 9.488$ at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 37.57 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus Infrastructural facilities have a significance influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya

4.8.2 Testing of the Second Hypothesis

H₁: School administrative practices have a significant influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.

Table 4.18 Showing Observed and Expected Responses on the Role of School Administrative Practices

Scale	SD	D	U	A	SA
Observed (O)	86	56	42	39	37
Expected (E)	52	52	52	52	52

Table 4.19 Showing Chi-Square Testing for the Second Hypothesis

O	E	(O-E)	(O-E) ²	(O-E) ² /E
86	52	34	1156	22.23
56	52	04	16	0.31
42	52	-10	100	1.92
39	52	-13	169	3.25
37	52	-15	225	4.33
				$\sum (O-E)^2/E = 32.04$

$\chi^2_C = 32.04 > \chi^2_{\alpha, 0.05}$ 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 32.04 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus School administrative

practices have a significant influence in the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya.

4.8.3 Testing of the Third Hypothesis

H₁: Financial resources have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.

Table 4.20 Showing Observed and Expected Responses on Role of Financial Resources.

Scale	SD	D	U	A	SA
Observed (O)	75	77	56	29	23
Expected (E)	52	52	52	52	52

Table 4.21 Showing Chi-Square Testing for the Third Hypothesis

O	E	(O-E)	(O-E) ²	(O-E) ² /E
75	52	23	529	10.17
77	52	25	625	12.02
56	52	04	16	0.31
29	52	-23	529	10.17
23	52	-29	841	16.17
				$\sum (O-E)^2/E = 48.84$

$\chi^2_C = 48.84 > \chi^2_{\alpha, 0.05}$ 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 48.84 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus financial resources have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.

4.8.4 Testing of the Fourth Hypothesis

H₁: Stakeholders have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.

Table 4.22 Showing Observed and Expected Responses on Role of Stakeholders

Scale	SD	D	U	A	SA
Observed (O)	32	40	75	77	36
Expected (E)	52	52	52	52	52

Table 4.23 Showing Chi-Square Testing for the Fourth Hypothesis

O	E	(O-E)	(O-E) ²	(O-E) ² /E
22	52	-30	900	17.30
40	52	-12	144	2.77
75	52	23	529	10.17
87	52	35	1225	23.56
36	52	-16	256	4.92
				$\sum (O-E)^2/E = 58.72$

$\chi^2_C = 58.72 > \chi^2_{\alpha, 0.05}$ 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 58.72 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus stakeholders have a significant influence in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusions and recommendation of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

The research aimed at finding out the factors that influence the implementation of ICT projects in public secondary schools in Kwale County. From an analysis and review of the research data and additional data gathered through the respondents and informants, a number of issues became apparent.

The first objective of the study was to establish how infrastructural facilities influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya. Data analysis, interpretation of interview responses and questionnaire responses from the respondents of the study revealed that infrastructure plays a major role in implementing ICT projects in schools. In the study for example, a greater percentage of above 60% of the schools were lacking formal and well equipped computer laboratories. Others had turned their classrooms into makeshift computer laboratories. Only 3.85% of the schools had more than 20 computers. With the increasing number of students in schools, a number less than 20 computers is much low than the standard agreed ICT4ED 2010 agreement. Only 20% of the population indicated that in their schools there was fully power supply from electricity and back-up generator while 10% of the schools still have no source of power. Frequent power black outs rated high as part of the challenges that were facing most schools in ICT projects implementation. Therefore, infrastructural development

has to be taken into account when implementing ICT projects in schools because they are closely tied.

On the objective that sought to establish how school administrative practices influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya. The respondents had the view that most administrators in secondary schools in Kwale County don't support the implementation of ICT projects fully. This was with 65% of the respondents, while 5% were not sure and 30% agreed that school administration supports ICT. The administrative practices included financing of computer programmes in school and facilitating in-service training of the teachers as well as employing teachers to teach computer skills. Most schools lacked ICT policies that would enable proper integration of ICTs in teaching and learning. High cost of ICT maintenance pushes the principals to cut down on the use of ICTs in teaching and learning. Some other Principals were found to be dictators who rarely accommodated the ideas of the benefits of ICT in school learning and teaching while others had great fear and bad notion that computers in schools were unnecessary expenditure and they could spoil the students once they accessed materials from the outside world.

The third objective was to determine how financial resources influence the implementation of Information Communication Technology projects in public secondary schools in Kwale County, Kenya. The study found out that most schools did not have enough financial resources set aside to boost and implement ICT projects. This was shown when 41.7% of the respondents strongly disagreed with the view that there are adequate financial resources for ICT projects in their schools while 45.8% of the respondents disagreed with the statement that their schools spend a reasonable amount of money on ICT implementation. This was also with the principals during the interview when 6 of the 8 strongly argued that implementing ICT projects in their schools was a challenge since most of them had constrained budgets. This has left many ICT projects in the public schools in Kwale County at a hanging level since most of them have no finances that could see their effective implementation.

On the final objective that sought to examine the influence of stakeholders in Information Communication Technology projects implementation in public secondary schools in Kwale County, Kenya, it was found that the major funding for ICT projects in schools came from the government. This was supported by 34.61% of the respondents, while 30.77% of the respondents went for the NGOs. This meant that the government and the NGOs are doing a lot to ensure ICT projects are a success though little has been done from the BOG, capable teachers and other relevant stakeholders like politicians. Besides stake holders like the BOG, Government and Donors not fully participating in implementing ICT projects by providing computers, finances and building computer laboratories just like it is done in other places, accessibility of the computers by students and teachers in most schools was limited to once a week or twice a month and this has been a factor that has led to poor ICT implementation in schools. These factors have dragged ICT projects implementation in public secondary schools in the Country.

5.3 Discussion of Findings

Infrastructure was found to be a major determinant of ICT projects implementation in schools. The insufficient power supply in most of the secondary schools in the region had contributed to the slow integration of ICTs in the schools. This was because most of the secondary schools were in the rural areas where there is inadequate electricity supply especially in the day schools coupled with inadequate power backup. UN Report (2013) had observed that many rural areas in Africa do not yet form part of the national electricity grid. This is particularly an acute problem since technology and internet can only be effective if it is generated by electricity. The research found out that 50% of the schools have electricity, 20% have both backup generators & electricity, and 10% have generators as their power source, 10% use solar power while the remaining 10% have no source of power at all. In addition, the study further found out that there were frequent power black outs, the schools with generators were faced with the challenge of generators running out of fuel and some broke frequently, while on the other hand, the solar power source was weak and not sufficient to give enough required power.

Most of the schools in Kwale County where the study was carried out were found not to be having formal computer laboratories forcing some schools to change one of their classes in a computer laboratory, some had their computers only left to rust in offices of the principal, others were in the store. Only 29.30% of the respondents said that their computers were placed in formal laboratories. The research further showed that 61.5 % of the schools sampled had computers in their schools while 38.5% had almost none .This was in agreement with the views by the World Bank Institute report (2009), that the backbone of ICT projects in education ties itself to infrastructural facilities that range from hard infrastructure like: computer laboratories, computers, electricity and computer hardware, to software infrastructure like local internet connection and computer software. Therefore, the slowed rate of ICT projects implementation in the region was highly tied to the fact that most schools were missing proper ICT infrastructure like electricity, computer laboratories, and the computer itself.

ICT projects implementation could be possible in the world when proper leadership and management come in afore. A study carried out by Anderson & Dexter (2010) on technology leadership behaviors of school principals established that, apart from ICT infrastructure being important in school, school leadership was the most determining factor in the process of effectively implementing ICT projects in schools. The study sought to find out the administrative practices that influence the implementation of ICT projects in Kwale count and found out that most administrators don't support the implementation of ICT projects fully. This was with 65% of the respondents while 5% were not sure and 30% agreed that school administration support ICT. According to Grono (2010), technological thinking and problems could be reduced through demonstrating clear visions, stranded with pedagogical understanding, and reflected in well-constructed, short-term and long-term, strategic plans .In Kwale county, all the interviewed principals lacked a strategic plan and vision for ICT projects in their schools.6 out of the 8 were found to be having misplaced ideas when they argued that ICT could lead to unnecessary expenditure, could spoil the students and the

teachers at large. Therefore, the research attributed the slow rate of ICT projects implementation to the fact that administration doesn't fully give fully support through hiring of ICT teachers, allocating funds and lacking both ICT vision and strategic plans in their schools.

According to Adomi (2010), cost has been reported as one of the factors which influence provision and use of ICT services. High cost of computer maintenance, high prices of computers and limited financial support for ICT projects from both the national government and County government made it hard for the ICT projects to be fully implemented in schools. The research found out that 41.7% of the respondents strongly disagreed with the view that there is adequate financial resources for ICT projects in their schools, 45.8% disagreed, 8.3% were uncertain, 4.2% agreed and there were no respondents who strongly agreed with the statement. Cost of computer accessories is high as the principals disclosed. Budget constraints in the schools cannot allow the principals to make investment in training their teachers on the use of computer programs in the class. To save on these costs they are forced to develop policies restricting the use of computer related materials which further disadvantages the teachers and the students. The MHEST and NCST (2010) also revealed that financial constraints in the implementation of ICT projects in schools was a key challenge; a factor that the researcher settles at.

Stakeholders like government, NGOs, teachers, students, BOG and many more were found to form a major component of ICT projects implementation in schools. According to the report published by World Bank (2010), Singapore classified the roles of the various stakeholders in ICT for education, and, each stakeholder was seen to have a major role to play. This was evident in the study whereby most of the funds for ICT came from the government followed by NGOs then BOG at the following rates. The government support stood at 34.61% of the respondents, 30.77% for the NGOs, 23.08% for the BOG, 7.69% for Teachers while other sources were said to be rated at 3.85%. However, when asked to give their position on the stakeholders, the principals argued that the major stakeholders like the national government and the NGOs gave very little attention to issues related to ICT projects implementation in

schools .This has seen most of the schools still continue operating on the old system of computers. Students and teachers access to the computers was limited to almost once in a week or two weeks. This was a major challenge since students and teachers made the component that does the ICT integration. This is therefore in line with the argument of the study that stakeholders play a major role in implementing ICT projects in public secondary schools in Kwale County.

5.4 Conclusion

The ICT projects have great advantage in improving all sphere of life including education in this 21st century. The research intended to establish the factors influencing the implementation of ICT projects in public secondary schools in Kwale County.280 questionnaires were given to teachers and students while 8 interview sessions were conducted on principals. The research found out that the interplay of factors have negatively influenced and slowed the use of ICT projects implementation projects in secondary schools.

This includes unavailability and inappropriate ICT infrastructure in the secondary schools; comprising of lack of computer laboratories in most schools, poor power supply and limited number of computers in most schools in the region. Internet connectivity was rated poorly in all the schools with some of them not having even a school e-mail address.

The administration has not fully owned ICT projects and most of the heads see it as an extra/unnecessary expense to the already constrained school budget. This was seen mostly when administration was required to hire/train teachers, maintain the computers, buy computers, construct computer laboratories and many more but could not take full responsibility in this. Also the administration has been faulted of using dictatorial sanctions towards the implementation of projects related to ICT; to the extent of some principals faulting ICT that it will spoil the teachers and students.

Lack of sufficient finances has been a challenge in most schools in Kwale County. Most of the schools are CDF schools that operate on very limited budgets. The schools have no sufficient funds allocated for ICT projects as per the study.

Most stakeholders have not taken the centre stage in implementing ICT projects. Most schools depended on the central government's support which is almost not reliable, a few NGOs and the school boards gave little support. This has been having an overall negative influence on ICT projects implementation.

The study will be very useful to the educational stakeholders if implemented since most of the issues dealt with have a direct impact to most schools in the country as far as ICT projects implementation are concerned. It is against this background therefore that the recommendations below are made.

5.5 Recommendations

Based on the findings of the study, the researcher recommends that:

1. Infrastructural facilities like construction of computer laboratories should be provided to facilitate the implementation ICT projects in the region. Electrification should be diversified in the rural areas as well as in all the corners of the county starting from Taru to Vanga to enhance the use of computers. Alternative sources of energy can be used in the remote places where it is very expensive to provide power adequately. Power back up system can help solve the problem power interruption.
2. The school administration should familiarize themselves with the national ICTs policies and especially in education in order for them to develop school ICT policy that would enable them integrate use of ICTs in teaching and learning in class. The administrators too should be induced into ICT projects through various seminars so to understand the importance of integrating ICT in their day to day operations in their schools.

3. Both the national government and county government should invest heavily in ICT projects in schools by providing adequate number of computers in schools and also enhance internet connection in the schools to ensure easy access to teaching learning materials in the web. The government also, should make available avenues in which the schools can acquire computers at a reduced cost. This can be done through tax waiver on computers meant for learning in the secondary schools.
4. The Ministry of Education should develop pre-service and in-service staff training programmes that are tailored to the school programmes to keep teachers up to date with the technological changes which will promote proper integration of ICTs in teaching and learning. More teachers should be deployed to the schools to train the students on the use of computers to increase the confidence when learning using ICTs. NGOs, BOG, teachers, students and all the school stakeholders should accept and buy the ICT factor as the main source of education liberation by giving the ICT projects sound support.

5.6 Suggestions for Further Studies

1. This study was carried out in one county only; a similar study could be carried out in the other Counties.
2. A study could be carried out to find out the factors that influence the implementation of ICT projects private secondary schools either in Kwale County or elsewhere.
3. A study can be carried out to determine the cost- benefit analysis of implementing ICT projects in secondary schools in Kenya.
4. A comparative study can be carried out on the impact of implementing of ICT projects in secondary schools' performance.
5. A study can be done to find out the cultural factors influencing the implementation of ICT projects in public secondary schools in Kwale County.

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APPENDIX 1:

INTRODUCTORY LETTER

P.O BOX 09-80402,

LUNGALUNGA.

CELL: +254 721 246 744

e-mail:martinotundo@gmail.com

Dear Sir/Madam,

REF: RESEARCH PROJECT

I am a secondary school teacher pursuing a Master degree in project planning and management at the University of Nairobi (Mombasa campus). I am undertaking a research project on factors influencing the implementation of ICT projects in public secondary schools in Kwale County.

The information gathered will be treated confidentially and strictly used for academic purpose only. Please provide honest and correct information according to your own views objectively in the questionnaire provided.

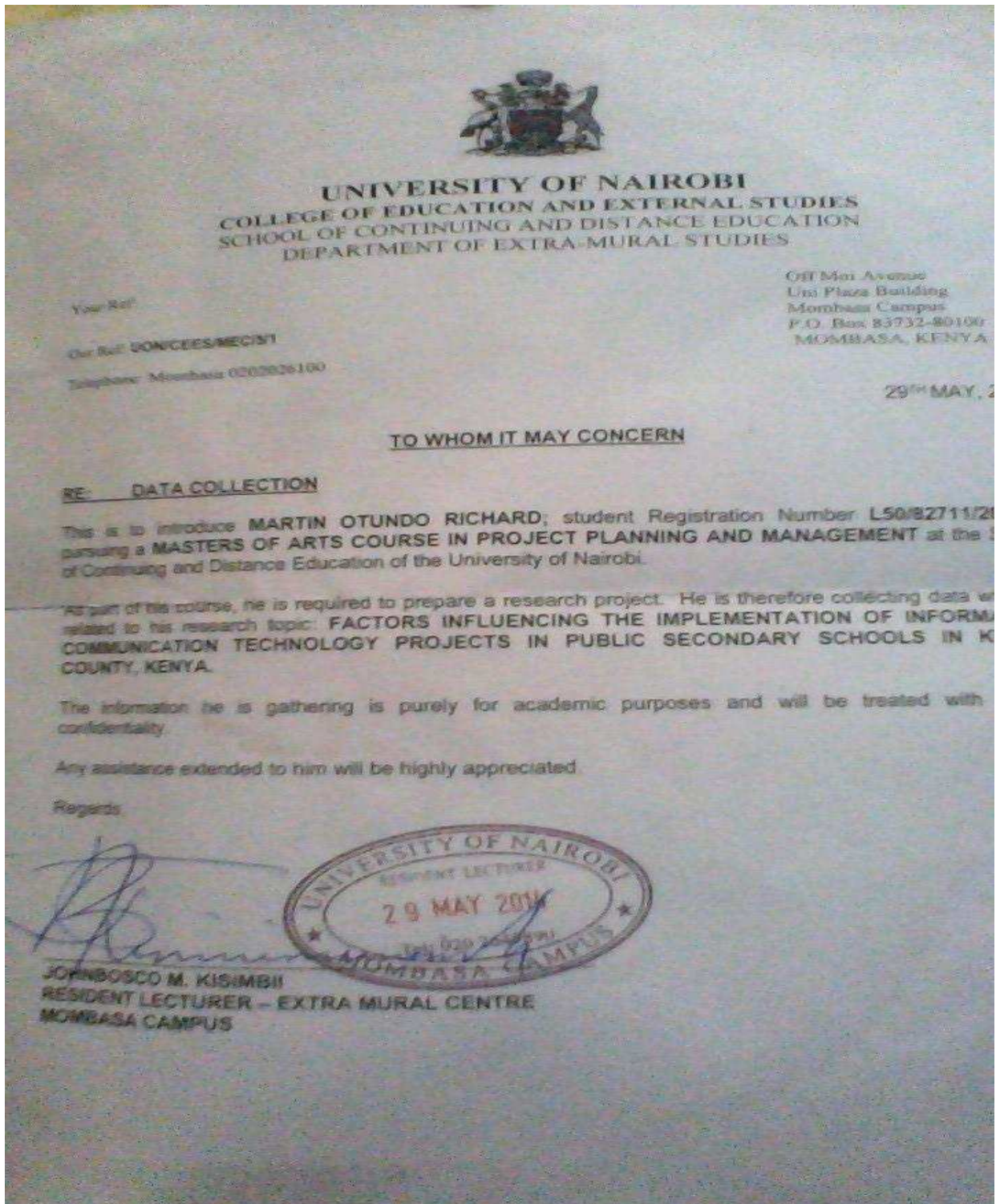
Thank you.

Yours faithfully

Otuuuundo

Martin Otundo Richard.

APPENDIX2:



APPENDIX 3:

LETTER OF INTRODUCTION



LUNGALUNGA SECONDARY SCHOOL
P.O BOX 09-80402 LUNGALUNGA

Our ref.....

Your ref.....

Date.....

TO WHOM IT MAY CONCERN

RE:MR.MARTIN OTUNDO RICHARD

The above named person is a teacher and H.O.D languages in our school. He is currently a student at the University of Nairobi (Mombasa Campus).

Currently he is doing his research in public secondary schools in Kwale County on the factors influencing the implementation on ICT projects in public secondary schools in the county. He is a very faithful and disciplined teacher who is greatly dedicated to his work.

Any support and information given to him during the study will be highly appreciated.

Thank you.

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Mr. Nduthu M.M.

Principal

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Mr. Martin Otundo

H.O.D Languages

APPENDIX 4:

RESEARCH QUESTIONNAIRE

A. Bio-Data: Tick (√) where appropriate.

1. Gender: Male () Female () Transgender ()
2. Age: 13-17yrs () 18-30yrs () 31-40yrs () 41-50yrs () Over 50yrs ()

B. Basic Information

3. School name _____ .Type of school _____
4. Highest level of education:
- Form: One /Two () Three/ Four (). (This is for students only).
 - Masters () Degree &PGDE () Degree () Diploma () Others (). (For teachers).

C. Item on Infrastructural Facilities

5. Does your school have computers? Yes () No ()
6. If yes in 5 above, approximately name how many? 0-5 () 5-10 () 10-15 () 15-20 ()
Above 20 ()
7. What is the main source of internet in your school? Prepaid modem ()
Internet server () Not connected ()
8. Where are computers located in your school? Computer laboratory () Offices ()
Converted classes () Staff room () Other places ()
9. Why do you think the answer you have given in 10 above is the most appropriate _____?
10. What is the main source of electricity/power in your school? Electricity ()
Electricity & Generators () Generators () Solar () No power supply ()
11. Explain your answer in 10 above _____

D. Item on Administrative Practices that Support ICT Implementation

12. Do you think the school administration fully supports ICT implementation? Yes ()
No () Not sure ()
13. Give a reason for your answer above _____

14. Indicate your position on the factors below appropriately: **1= Strongly Disagree**

2= Disagree 3= Weakly Agree 4= Agree 5= Strongly Agree

Factor	1	2	3	4	5
The school administration us ICT in administrative purposes					
school administration embraces students involvement with ICT					
The school is on a website					
The school has an e-mail address					
Majority of the offices are equipped with ICT equipment					

E. Item on Effects of Financial Resource on ICT Implementation

15. Indicate the extent to which you agree that the following reasons influence the adoption of ICT in your school. SA-Strongly agree, A- Agree, U- Uncertain, D-Disagree,

SD- Strongly disagree

Factor	SA	A	U	D	SD
There is adequate financial resources allocated for ICT implementation					
The school spends a reasonable amount of money on ICT implementation					
The school is capable economically to implement ICT					

F. Item on the Role of Stakeholders in ICT Implementation

16. Name the source of computers and other ICT projects related enablers in your school.

BOG () Teachers () Government () NGOs ()

17. How often do students and teachers access the computers for their lessons?

No response () Daily () Weekly () Monthly () Once a term ()
Never ()

APPENDIX 5

INTERVIEW GUIDE FOR THE PRINCIPALS

Answer the following questions to the best of your knowledge. You should note that the questions are meant for a research to establish the determinants of ICT implementation in secondary schools.

1. Does the infrastructural facility have any effect in the implementation of ICT in secondary schools? Explain.

2. What is the role of different ICT stakeholders like students, politicians, NGOs, government, teachers, parents and the school BOG in the implementation of ICT in secondary schools?

3. Explain elaborately the role of the school administration on implementation of ICT in secondary schools.

4. What is the role of finance in implementation of ICT in secondary schools?

Thank you.